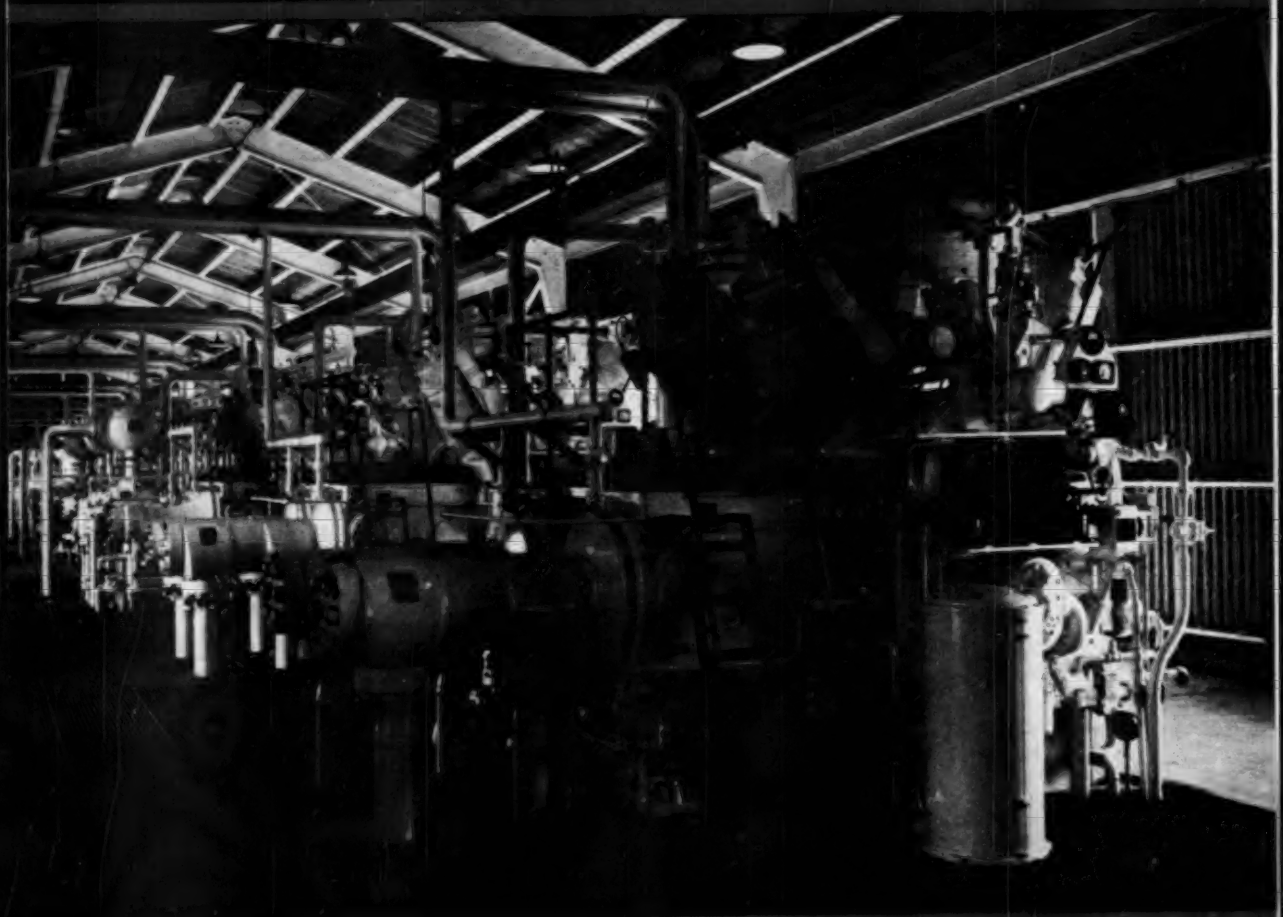
VOL. V, No. 11 NOVEMBER, 1950

AGRICULTURAL CHEMICALS



In This Issue

KILLING POWER

...that's the thing!

Whatever your insecticide needs, the POWCO BRAND trade mark is your assurance of dependability... a quality more important to you today than ever before. Tightening supplies call for sound planning—advance contracting to assure sufficient supplies in 1951. For complete dependability... *look to Powell!*

POWCO BRAND

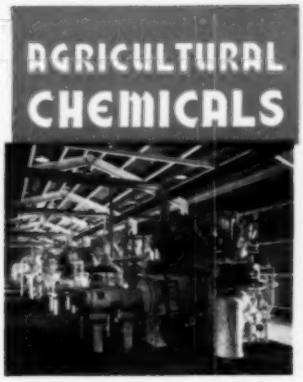
KILLING POWER—THAT'S THE THING!

John Powell & Co., Inc.

ONE PARK AVENUE, NEW YORK 16, N. Y.

Sales Offices: Philadelphia • Pittsburgh • Huntsville • Chicago • Fort Worth • Denver • San Francisco
Canada: Charles Albert Smith, Ltd., Toronto, Montreal • Argentina: John Powell y Cia
Representatives in Principal Cities of the World

ALLETHRIN • DDT • CHLORDANE • PYRETHRUM & PYRIN • PIPERONYL BUTOXIDE • ROTENONE
SABADILLA • ANTU • 2,4-D & 2,4,5-T • BHC • LINDANE • TOXAPHENE



THIS MONTH'S COVER

Productive capacity in the agricultural chemical field is being expanded constantly. Here is a row of ammonia compressors in the new compressor building, a part of Dow Chemical Company's new ammonia plant at Freeport, Texas. Technical grade anhydrous ammonia will be produced here for direct fertilization of soil on the west coast and the Delta region.

NOVEMBER 1950

VOL. V No. 11

In This Issue:

A Monthly Magazine For the Trade

•

LAWRENCE A. LONG
Editor

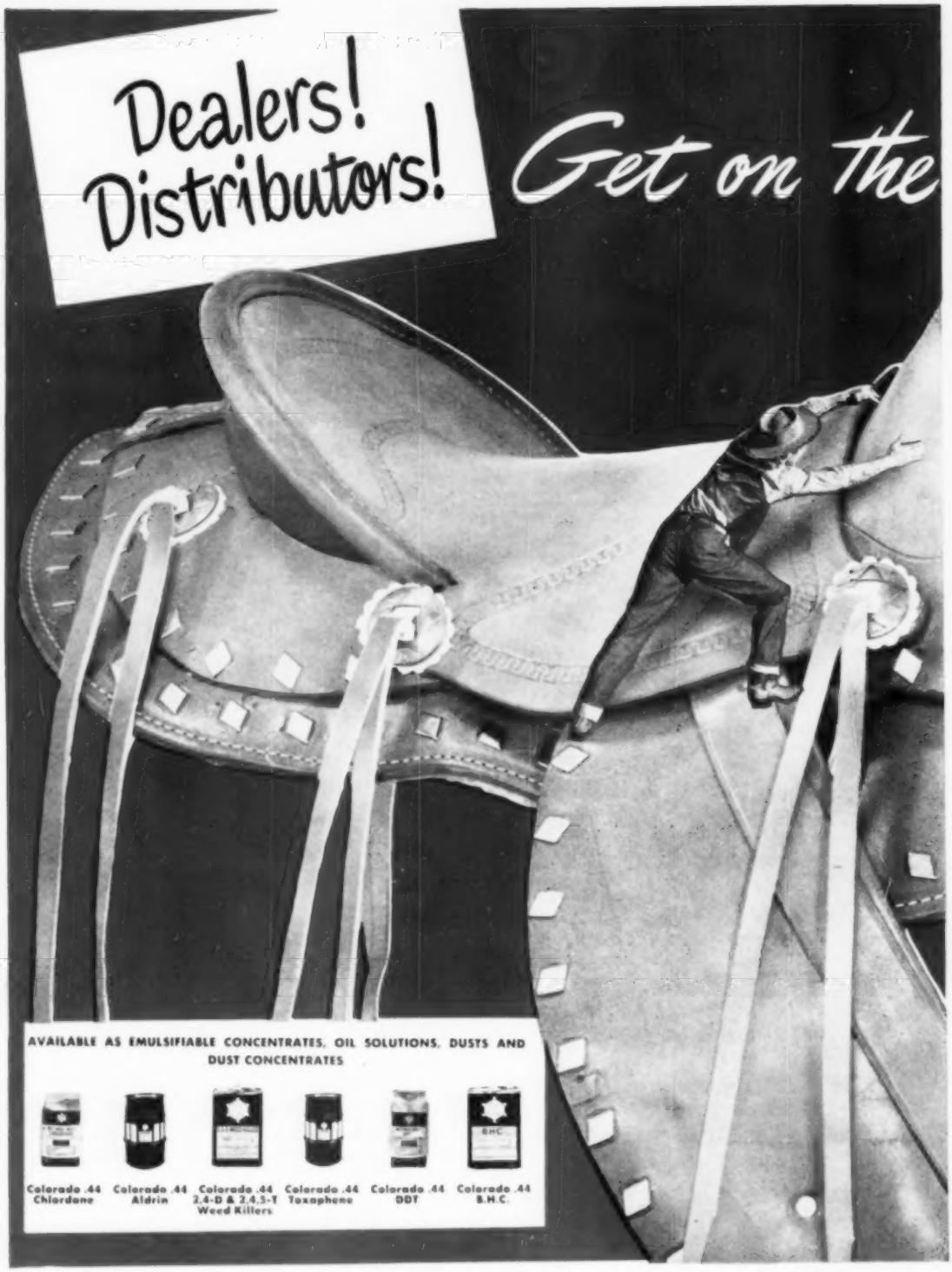
THOMAS MORGAN
Advertising Manager

•

AGRICULTURAL CHEMICALS

Subscription Rates: *One year, United States, $3.00; Canada and Pan American countries, $4.00; Foreign, $5.00. Published monthly on the 15th by Industry Publications, Inc. Wayne E. Dorland, President; Ira P. MacNair, Secretary-Treasurer. Publication office, 123 Market Place, Baltimore 2, Md. Advertising and editorial offiec 254 W. 31st St., New York 1, New York — Chicago Office, 333 N. Michigan Blvd. Advertising rates made known on application. Closing date for copy — 20th of the month previous to date of issue.*

Entered as second-class matter November 4, 1943, at the Post Office at Baltimore, Md., under the Act of March 3, 1879.


Dealers!
Distributors!
Get on the
AVAILABLE AS EMULSIFIABLE CONCENTRATES, OIL SOLUTIONS, DUSTS AND DUST CONCENTRATES
Colorado .44 Chlordane
Colorado .44 Aldrin
Colorado .44 2,4-D & 2,4,5-T Weed Killers
Colorado .44 Toxaphene
Colorado .44 DDT
Colorado .44 B.H.C.

COLUMBIA

PARA-DICHLOROBENZENE
ORTHO-DICHLOROBENZENE

If you repack or compound, you can rely on the uniform purity of Columbia Para-Dichlorobenzene and Ortho-Dichlorobenzene.

Care in manufacturing, convenient plant location, and mixed car shipments also are favorable factors when you make Columbia your source of supply.

Further information on Para-Dichlorobenzene and Ortho-Dichlorobenzene is available upon request. Your inquiries are invited. Pittsburgh Plate Glass Company, Columbia Chemical Division, Fifth Ave. at Bellefield, Pittsburgh 13, Pennsylvania.

COLUMBIA PARA-DICHLOROBENZENE

White to clear crystals with a pleasantly aromatic odor. Vaporizes readily; insoluble in water. Six mesh sizes. Packed in 25, 50, 100 and 200 lb. fiber containers.

COLUMBIA ORTHO-DICHLOROBENZENE

A clear liquid with a pungent but not unpleasant odor. Insoluble in water; relatively low volatility. In 55 gallon drums and 8000 gallon tank cars.

COLUMBIA CHEMICALS

CHICAGO • MINNEAPOLIS • BOSTON
NEW YORK • CINCINNATI
ST. LOUIS • CHARLOTTE • PITTSBURGH
CLEVELAND • PHILADELPHIA

PAINT • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

YOUR PRODUCT IS IN SAFE HANDS WHEN PACKED IN FAMOUS Fulton W.P.P.L. BAGS

Fulton W.P.P.L. (Waterproof Paper Lined) bag is the ideal container for export or domestic shipments of hygroscopic materials, and products to be protected against absorption of moisture or odors.

Fulton W.P.P.L. Bags are made of tough cotton or burlap and sealed to paper or plastic linings with special adhesives. The toughness and flexibility which contributes to ease and safety in handling is causing more and more manufacturers to use Fulton W.P.P.L. Bags for products that formerly required rigid containers. They are definitely storage-space savers.

Investigate the advantages of these modern containers for your product. Write the Fulton branch nearest you.

Your style **MULTIWALL PAPER BAG** is made by Fulton — any size, all types, pasted or sewn bottom, open mouth or valve. Fulton makes the MULTIWALL to fit your product. Write for further information.

Fulton
BAG & COTTON MILLS

ATLANTA • ST. LOUIS • DALLAS • KANSAS CITY, KANS.
DENVER • MINNEAPOLIS • NEW ORLEANS • LOS ANGELES • NEW YORK CITY

what big ears cornstalks have when protected with SANTOBANE!

LOOK AT THE DIFFERENCE when corn borers are controlled!

MONSANTO'S DDT

When borers are kept out of corn with Santobane, Monsanto's DDT, ears grow larger.

Those are facts that farmers *know*. For that reason, there will be heavy demand for Santobane next summer when the battle of borers begins again. Better order your supply of Santobane right away. Be ready to profit when demand is heavy.

Santobane is available for shipment by the 100-pound bag or carload. For further information, mail the coupon or contact the nearest Monsanto Sales Office. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1766-L South Second Street, St. Louis 4, Missouri.

Monsanto Insecticidal Chemicals

SANTOBANE* (DDT)
SANTOCHLOR* (para-Dichlorobenzene)
SANTOPHEN* 20 (Pentachlorophenol, Tech.)
TRICHLOROBENZENE, Technical
NIFOS*-T (Tetraethyl Pyrophosphate, Tech. For agricultural use only)
NIRAN* (Parathion. For agricultural use only)

Monsanto Herbicidal Chemicals

2,4-D ACID
2,4-D SODIUM SALT
2,4-D ISOPROPYL ESTER
2,4,5-T ACID
2,4,5-T ISOPROPYL ESTER
SANTOBRITE* (Sodium Pentachlorophenate, Tech.)
SANTOPHEN 20 (Pentachlorophenol, Tech.)

*Reg. U. S. Pat. Off.

MAIL COUPON FOR DATA on Monsanto Emulsifiers and Wetting Agents. Ask for *new* Technical Bulletin No. P-142.

DISTRICT SALES OFFICES:
Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

MONSANTO
CHEMICALS — PLASTICS

MONSANTO CHEMICAL COMPANY
Organic Chemicals Division
1766-L South Second Street, St. Louis 4, Missouri

Please send: ... Santobane information; ... Bulletin P-142; ... Information on these chemicals .....

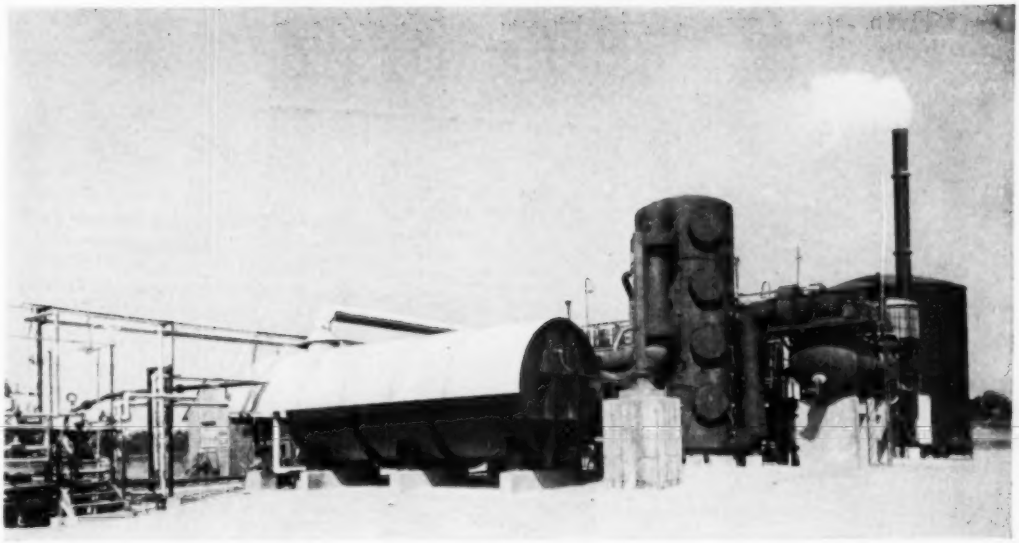
Name ..... *Title* .....
Company .....
Street .....
City ..... *Zone* ..... *State* .....

SERVING INDUSTRY . . . WHICH SERVES MANKIND

First New-Type

CHEMICO SULFURIC ACID PLANT

now in operation



The first plant, utilizing Chemico's new process for making sulfuric acid from sulfur, is now in successful operation at the Hamilton, Ohio works of the American Cyanamid Company. This new unit—rated at 50 tons per day can deliver sulfuric acid of any strength up to 95% H_2SO_4.

This new-type Chemico plant is basically simpler than conventional type contact sulfuric acid plants. The new process differs in these basic ways.

• It converts SO_2 to SO_3 in a highly efficient quench converter. This eliminates heat exchangers . . . assures higher yield from raw sulfur . . . virtually eliminates contamination due to unconverted SO_2.

• From the converter, the SO_2 gas mixture passes through a multiple dip-pipe absorption system, which operates by gravity flow. There is no need to distribute acid over packed absorbing towers.

• Water evaporation from absorber acid solutions removes heat of absorption and the sensible heat of hot gases. Only a small amount of cooling water is required for the product acid before storage.

• A built-in Pease-Anthony Venturi Scrubber insures mist elimination in the exhaust stack.

• Seven major items of equipment — usually found in present-type contact acid plants — have been eliminated: drying tower, gas filter, heat exchanger, SO_3 cooler, acid coolers, acid circulating and transfer pumps and diluting equipment.

THE RESULTS — The new-type plant is much smaller. It can be economically built and operated. Investment cost is lower per ton of capacity. Startup, shutdown and operation are easier.

CC 207

CHEMICAL CONSTRUCTION CORPORATION

A UNIT OF AMERICAN CYANAMID COMPANY

488 MADISON AVENUE, NEW YORK 22, NEW YORK

EUROPEAN TECHNICAL REPRESENTATIVE

CYANAMID PRODUCTS, LTD., LONDON W.C.2, ENGLAND • CABLES: CHEMICONST, NEW YORK

Chemico plants are profitable investments

DAVISON
GRANULATED SUPERPHOSPHATE
offers 3-Way Control

1. Davison Granulated Superphosphate stores without caking, in your warehouse, in the farmer's barn. That's storage control.

2. It pours freely in your plant and drills freely and evenly in the field with a minimum of dusting, without bridging and clogging. That's handling and application control.

3. Each granule has a hardened but porous surface, which releases plant food at a correct rate. That's food control.

Only Davison uses an exclusive finishing process that produces superphosphate in granules. Davison Granulated Superphosphate thus offers you a number of sales points that you can use to make your business grow.

Davison is a primary producer of superphosphates, mining its own phosphate rock, producing its own acid, scientifically controlling every step of the process. Thus you get quick delivery of the highest quality, either bulk or bagged. Price puts you in a favorable competitive position.

Progress through Chemistry

THE DAVISON CHEMICAL CORPORATION

Baltimore 3, Maryland

EXCLUSIVE PRODUCERS OF GRANULATED, AND ONE OF THE OLDEST AND LARGEST PRODUCERS OF NORMAL GRADES OF SUPERPHOSPHATES

WHAT IS Rax?...BROTHER IT'S MURDER TO US RATS and MICE

RAX Powder, a new rat and mouse killer containing the chemical warfarin (WARF Compound 42*) is now available for general agricultural use. Farmers who used it experimentally have reported easy, economical and safe control of rats and mice on the farm. Results from all over the country indicate that RAX is 85-90% effective in killing rats and mice.

RAX is the new rodenticide developed by Wisconsin Alumni Research Foundation that kills rats and mice by causing internal hemorrhage. It is tasteless and odorless to the rodent, therefore easy to feed him in bait he will accept. Prentiss now makes RAX available for professional use, for packaging under private label or for manufacture into prepared baits that have long shelf life.

Millions of dollars worth of insecticides and fungicides are used each year to produce our nation's farm crops. But little or nothing is done to protect them from the 150,000,000 rats and untold number of mice that attack these crops in storage. $400,000,000 is a big price to pay for this damage. Rats eat or spoil half this amount yearly in cereals and cereal products alone.

When crops are protected in the field, only half the job is done. It's just as important for the farmer to protect his crops in storage as it is to protect them in the field.

*Distributed under U. S. Patent No. 2,427,578

For complete information and price schedule, send in this handy coupon today:

PRENTISS DRUG & CHEMICAL CO., INC.

formerly

R. J. PRENTISS & CO., INC.

110 WILLIAM ST., NEW YORK 7, N. Y.
9 SO. CLINTON ST., CHICAGO 6, ILL.

I'm interested in RAX for ☐ professional use ☐ repackaging under private label ☐ manufacturing with prepared baits. Please send full information and prices.

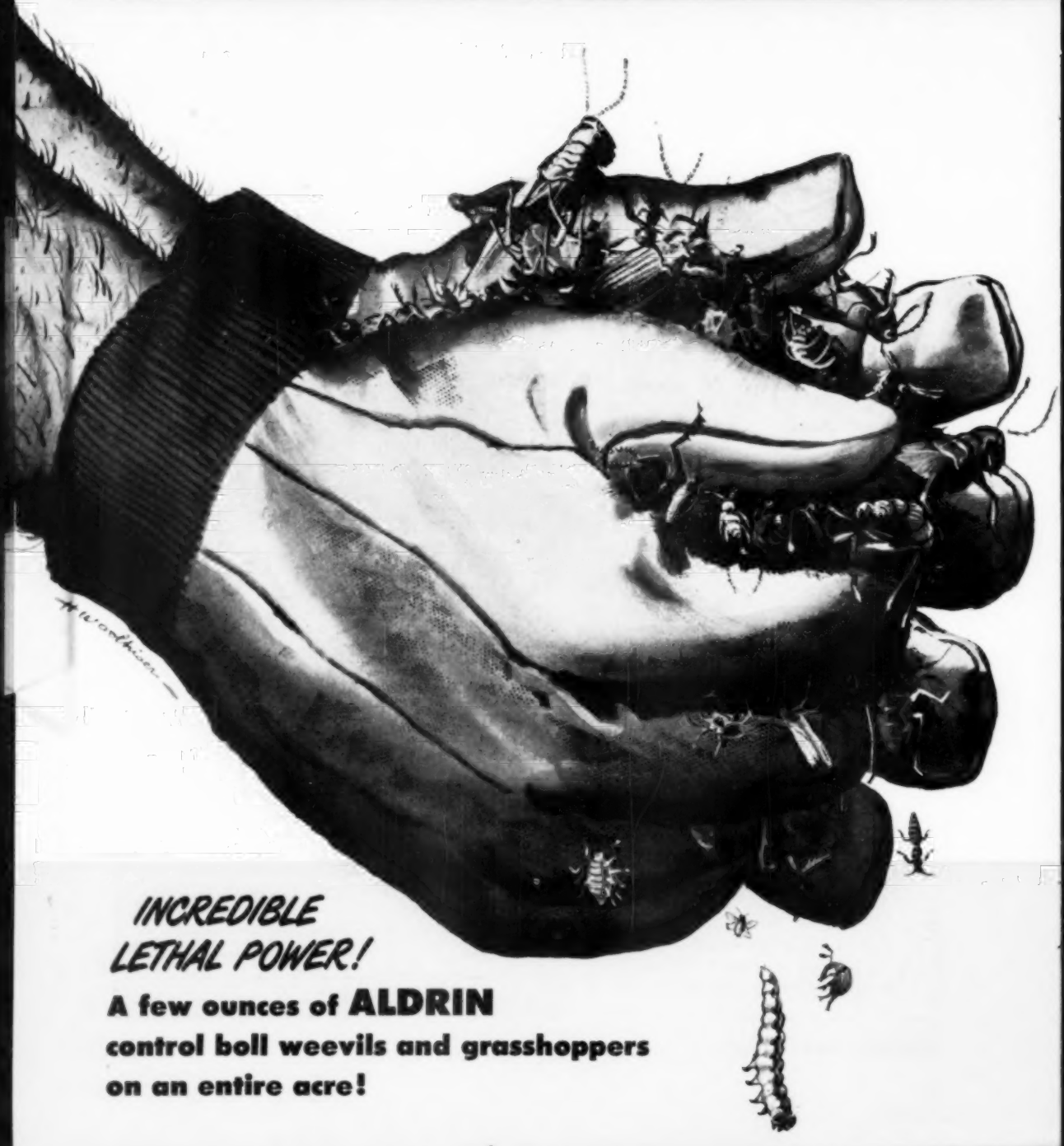
Name _____

Company _____

Address _____

City _____ Zone _____ State _____

Here are the startling facts



INCREDIBLE LETHAL POWER!

A few ounces of ALDRIN control boll weevils and grasshoppers on an entire acre!

about ALDRIN

(COMPOUND 118)

2,000,000 POUNDS of ALDRIN* used in 1950 on cotton insects and grasshoppers

Cotton pest control with 4 ounces per acre! Cotton growers are enthusiastic about this powerful new insecticide because of its rapid action and excellent performance against boll weevils, plant bugs, fleahoppers and thrips. All these pests are controlled with a 4-ounce per acre dosage in either dust or spray form.

Grasshopper control with 2 ounces per acre! The three Canadian Prairie Provinces—Alberta, Saskatchewan and Manitoba—used 500,000 pounds of Aldrin in 1950 to combat a very bad grasshopper infestation. Aldrin was the only "hopper stopper" used and excellent control was obtained with a spray containing but 2 ounces per acre. *That's 8 acres of dead grasshoppers per pound of Aldrin!*

Compatible with farm chemicals! Aldrin is entirely compatible with all commonly used insecticides and fungicides. It is the only chlorinated hydrocarbon insecticide that is stable in the presence of strong alkalis. Aldrin does not lose its power on whitewashed surfaces or in lime mixtures.

Plan 1951 Aldrin formulations now! Mail the coupon today for complete details. **Shell Chemical Corporation** is the exclusive national distributor of unformulated Aldrin and Dieldrin which are manufactured by **Julius Hyman & Company.**

*3,400,000 pounds of 60% Aldrin Equivalent Solution.

TECHNICAL GRADE ALDRIN AND DIELDRIN WILL SOON BE AVAILABLE

SHELL CHEMICAL CORPORATION

Please send all available data on Aldrin.

Name_____

Position or Title_____

Company_____

Address_____

City_____ State_____

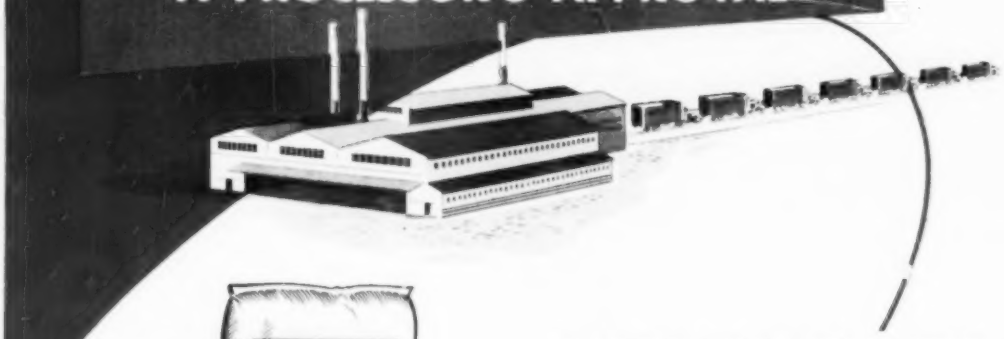
SHELL CHEMICAL CORPORATION

CHEMICAL PARTNER OF INDUSTRY AND AGRICULTURE

Eastern Division: 500 Fifth Avenue, New York 18
Western Division: 100 Bush Street, San Francisco 6

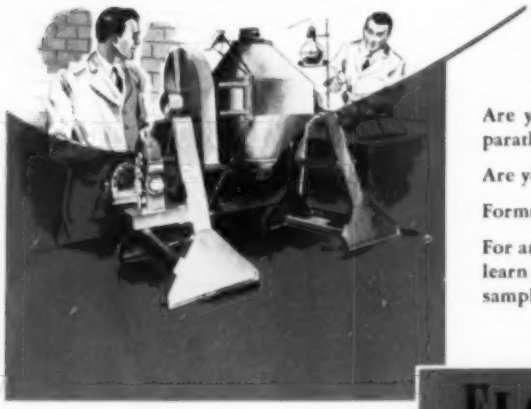
DILUEX ... *wins*

A PROCESSOR'S APPROVAL



On the basis of technical study and practical experience, Floridin products, extracted and specially processed at Quincy and Jamieson, Florida, are coming into more and more general use in the agricultural chemical industry. Here are the steps in a typical case:

1. Laboratory formulations, and comparisons with alternative materials.
2. Laboratory report.
3. Plant tests, for volume and quality output.
4. Approval of plant management.
5. Increased production and sales volume.
6. Continuing increases of tonnage to meet growing demand.



Are you impregnating toxaphene—chlordane—aldrin—parathion—any liquid toxicant?

Are you milling DDT, BHC, or other organics?

Formulating blended dusts?

For any of these processes, it will be worth your while to learn about DILUEX and DILUEX-A. Your request for samples and additional data will receive prompt attention.

FLORIDIN COMPANY

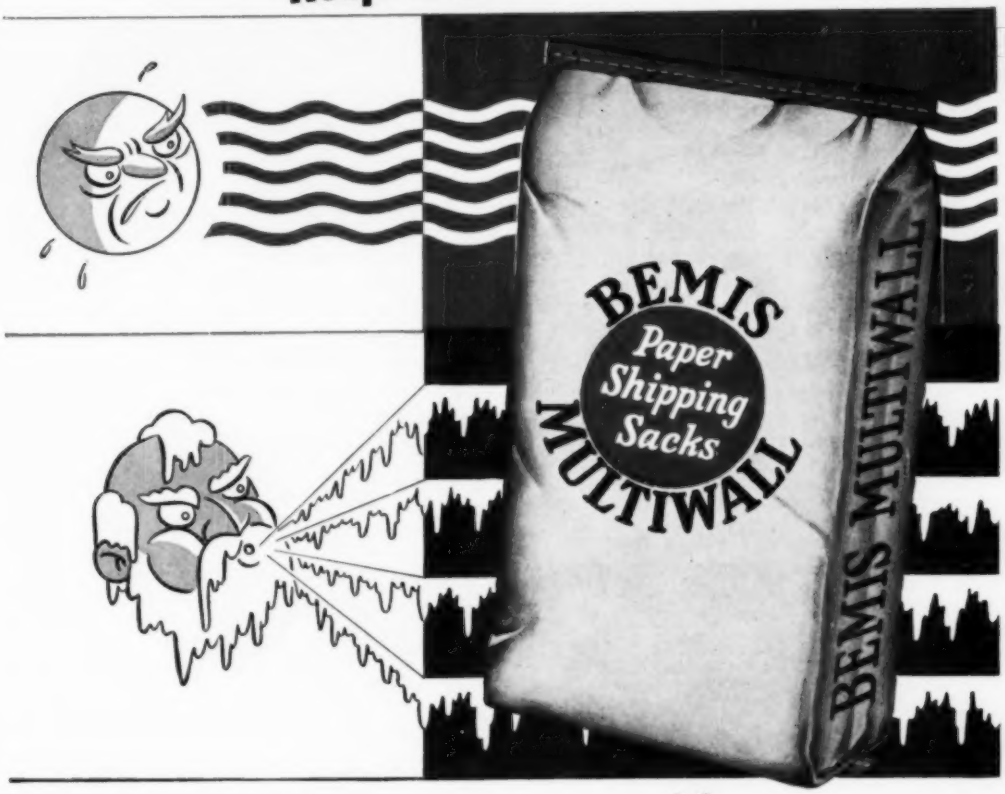
Adsorbents ..... Desiccants ..... Diluents

Dept. M, 220 Liberty St., Warren, Pa.

Be Multiwall Wise

Acclimatize

Keep Bags From Getting Thirsty



Multiwall Paper Shipping Sacks are amazingly tough. They don't need to be pampered. But they *do* need reasonable care. Unless they're protected against moisture loss, they dry out and can't work their best when being packed, closed, or handled. In some sections of the country "drying out" may happen in winter, in other sections during the summer, depending on the humidity. But it's a simple matter to keep Multiwalls from getting thirsty. Bemis Multiwall Specialists show you how.

Bemis BEMIS BRO. BAG COMPANY *"America's No. 1 Bag Maker"*

PEORIA, ILL. • EAST PEPPERELL, MASS. • SAN FRANCISCO, CALIF. • WILMINGTON, CALIF. MOBILE, ALA. • VANCOUVER, WASH. • HOUSTON, TEXAS

Baltimore • Boise • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Cleveland • Denver • Detroit Indianapolis • Jacksonville, Fla. • Kansas City • Los Angeles • Louisville • Memphis • Minneapolis New Orleans • New York City • Norfolk • Oklahoma City • Omaha • Phoenix • Pittsburgh • St. Louis Salina • Salt Lake City • Seattle • Wichita

MAIL THIS COUPON TODAY!

BEMIS BRO. BAG CO., 408 Pine St., Box 66, St. Louis 2, Mo.

☐ Have Multiwall Specialist give information on care of bags.
☐ Send information on Multiwall specifications.

Name _____

Company _____

Address _____

City _____ *Zone* _____ *State* _____

PARATHION LABELING CLAIMS ACCEPTED

Claims covering control of the following insects and mites attacking fruits and vegetables with parathion wettable powders, emulsions and/or dusts have been accepted for labeling purposes by the Insecticide Division, Production and Marketing Administration, USDA. Before using parathion, individuals should be familiar with the necessary precautions for safe handling and application. To obtain more details on handling precautions as well as on dosage and timing of treatments, please write for Parathion Growers' Handbook.

FRUITS AND NUTS

Apple: Parathion controls codling moth, plum curculio, orange tortrix, San Jose, Forbes and scurfy scales, red-banded leaf roller, woolly apple aphid and mealybug; also controls bud moth, red bug, fruit tree leaf roller, rosy apple aphid, green apple aphid, grasshoppers, European red mite, two-spotted mite, Pacific mite, Schoenii mite, Willamette mite and clover mite.

Pear: Good control of pear blister mite and pear psylla, as well as codling moth, mealybug, woolly aphid and certain spider mites is achieved with parathion.

Peach: Plum curculio, Oriental fruit moth, San Jose scale, peach tree borer and cat-facing insects are controlled by parathion; also fruit tree leaf roller, cottony peach scale, green peach aphid and spider mites.

Prune and Plum: Plum curculio, bud moth, mealy plum louse, tortrix, leaf roller, leafhoppers, aphids and spider mites are controlled.

Apricots: Outstanding for control of codling moth, Oriental fruit moth, tortrix, bud moth, fruit tree leaf roller, spider mites and aphids.

Cherry: Controls plum curculio, cherry fruitworm, Oriental fruit moth, bud moth, tortrix, and cankerworm; also mites and aphids.

Grape: Mealybug, red spider mite and leaf folder are controlled by parathion.

Blueberry: Use parathion for maggot and thrips control.

Strawberry: Parathion controls red spider, leaf roller, aphids and red spider mite.

Walnut: Parathion effective against codling moth, aphids and red spider.

VEGETABLES

Beans: For control of Mexican bean beetle, leafhopper, aphids, red spider, armyworms, leaf roller and leaf miner.

Beet: Webworms and aphid are controlled by parathion.

Carrot: For use against aphid.

Cabbage, broccoli, Brussels sprouts, kale, mustard, turnip and other related crops: Parathion controls diamondback moth, imported cabbageworm, armyworms, aphid and thrips.

Celery: Use against celeryworms and aphids.

Cucumber, squash and melons: Controls cucumber beetle, melonworm, pickleworm, serpentine leaf miner and aphid.

Pepper: Parathion is effective against aphid and serpentine leaf miner.

Okra, pea, and spinach: Good aphid control is obtained with parathion.

Onions: For thrips.

Potato and tomato: Supplementing a regular fungicide program, parathion controls Colorado potato beetle, flea beetle, leafhopper, serpentine leaf miner, grasshoppers, whitefly and aphid.

Artichoke: Use against plume moth and aphid.

Be sure to write for Growers' Handbook on parathion

AMERICAN Cyanamid COMPANY
Agricultural Chemicals Division
32-D ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

Please send me Growers' Handbook giving latest recommendations for using parathion.

Name _____

Address _____

He's Not Surprised to get Tobacco like this

because he used a fertilizer containing *Sul-Po-Mag*

Well, maybe this grower is a *little* surprised . . . but then he *expects* to get outstanding results when he uses fertilizer containing *Sul-Po-Mag*.

Magnesium deficiency is so prevalent in tobacco soils that growers are using water-soluble magnesium extensively to get earlier maturity, healthier growth, larger yields, and finer quality.

The most practical and economical way to supply soluble magnesium for many crops is with a fertilizer containing *Sul-Po-Mag*, a properly balanced, natural combination of magnesium and potash in water-soluble form and immediately available to crops. *Sul-Po-Mag* is produced exclusively by *International* at its Carlsbad, New Mexico Mines, and is shipped in the excellent mechanical condition you want for easy, low-cost handling.

Use *Sul-Po-Mag* in your fertilizer mixtures to meet the demand for plant foods that will give the best possible results on magnesium deficient soils.

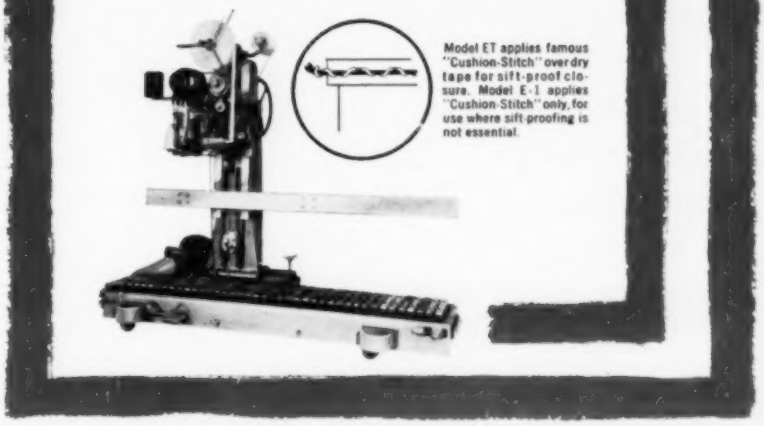
SUL-PO-MAG (Water-Soluble Double Sulfate of Potash-Magnesia)
MURIATE OF POTASH • SULFATE OF POTASH

Sul-Po-Mag®
Water-Soluble
Double Sulfate of Potash-Magnesia

INTERNATIONAL POTASH

POTASH DIVISION International Minerals & Chemical Corporation **INTERNATIONAL MINERALS & CHEMICAL CORPORATION**

General Offices: 20 North Wacker Drive, Chicago 6



THE RIGHT COMBINATION FOR BETTER BAG PACKAGING

Multiwall paper bag specialists supervised the design of Bagpak Machines. That's why these machines perform at top efficiency. That's why they give long, trouble-free service. And that's why the Model ET, for example, provides a superior closure—the sewn-thru "Dry-Tape" with the famous "Cushion Stitch".

The combination of multiwall paper bags and Bagpak Machines is your key to lower costs and better bag packaging. Write for a descriptive brochure today.

BAGPAK MULTIWALL BAGS

International Paper Company

BAGPAK DIVISION

220 East 42nd St., New York 17

BAG PACKAGING MACHINES

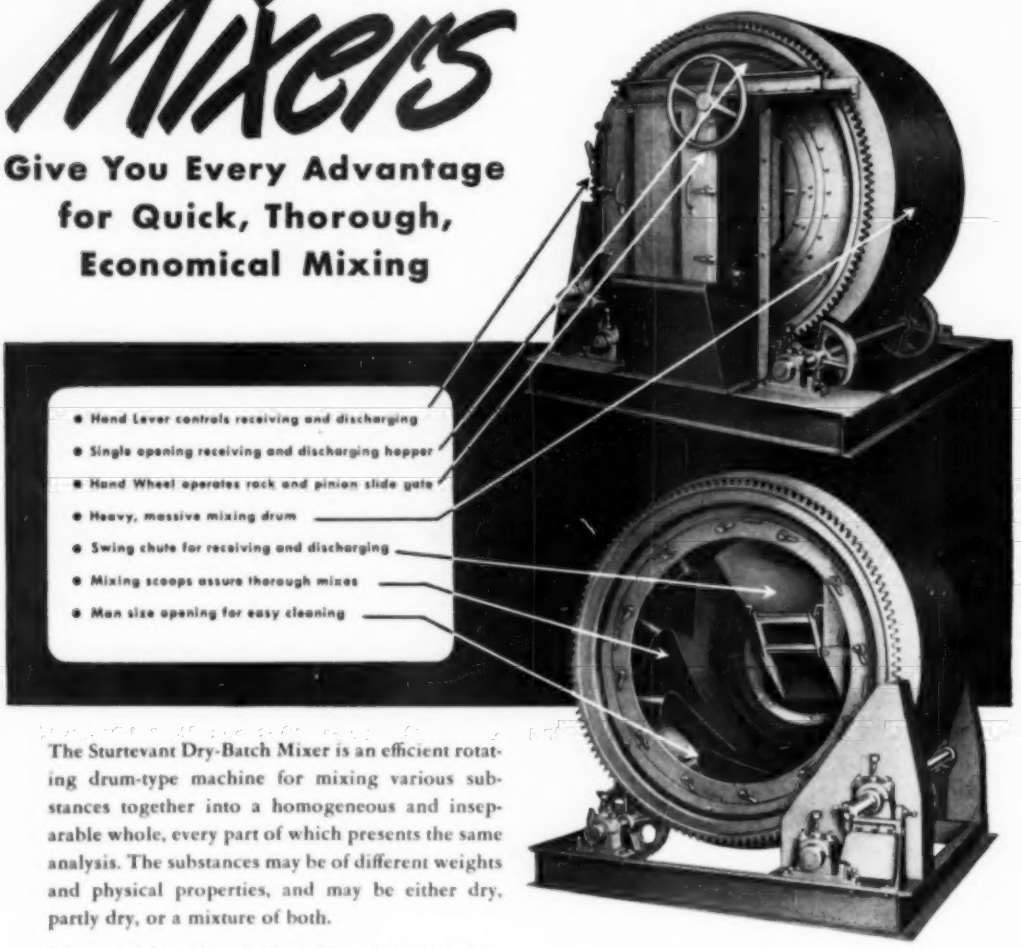
BRANCH OFFICES: Atlanta • Baltimore • Baxter Springs, Kansas • Boston • Chicago • Cleveland • Denver • Los Angeles • New Orleans • Philadelphia • Pittsburgh • St. Louis • San Francisco

IN CANADA: The Continental Paper Products, Ltd., Montreal, Ottawa

Sturtevant Dry Batch

Mixers

Give You Every Advantage for Quick, Thorough, Economical Mixing



The Sturtevant Dry-Batch Mixer is an efficient rotating drum-type machine for mixing various substances together into a homogeneous and inseparable whole, every part of which presents the same analysis. The substances may be of different weights and physical properties, and may be either dry, partly dry, or a mixture of both.

Because of the unique design of its mixing chamber, and the 4-way mixing action which brings two or more substances together, the Sturtevant Dry-Batch Mixer does a more rapid mixing job than other machines and, at the same time, it is complete and thorough in every particular.

Write for bulletin today.

STURTEVANT MILL COMPANY

123 Clayton Street, Boston 22, Mass.

Designers and Manufacturers of:

CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS
ELEVATORS • MIXERS
MECHANICAL DENS and EXCAVATORS

Compare These Advantages

- Only one lever controls both receiving and discharging for simplicity of operation. Hand wheel operates rack and pinion slide at feed opening.
- 4-way mixing action speeds production...assures thorough blends.
- "Open-door" accessibility permits easy, fast, thorough, cleaning.
- Single aperture drum for both intake and discharge.
- Unusually efficient scoops pick up materials to effect thorough mixing as drum revolves.
- 5 models . . . a size for every mixing job . . . smallest size mixes up to $7\frac{1}{2}$ tons per hour . . . largest size up to 75 tons per hour.

V-C

V-C fertilizers

Complete Fertilizers Superphosphate
Concentrated Superphosphate
Phospho Plaster Sulphuric Acid

V-C phosphate rock products

Phosphate Rock, *Ground and Unground*
Calcined Phosphate Rock Nodulized Phosphatic Materials

V-C cleansers

The Vicar® Line of Cleansers

V-C fibers

Vicara® Textile Fibers
Zycon Fibers

V-C bags

Burlap Bags Cotton Bags
Paper Bags

V-C chemicals

Phosphoric Acids
Phosphorus
Calcium Phosphates
Disodium Phosphate
Trisodium Phosphate
Tetrasodium Pyrophosphate
Sodium Tripolyphosphate
Sodium Metasilicate
Liquid Sodium Silicates
Nicotine
Tetra Ethyl Pyrophosphate

V-C PRODUCTS

VIRGINIA-CAROLINA CHEMICAL CORPORATION
General Offices: 401 East Main Street, Richmond, Virginia

Black Leaf®

PEST CONTROL PRODUCTS

Black Leaf 40—for spraying fruits, vegetables and flowers, to control aphids and similar sucking insects. Also used to control certain external parasites of cattle, sheep, and poultry—and as a drench for sheep.

Black Leaf Dry Concentrate—a dry powdered nicotine compound that combines the versatility of Black Leaf 40 with the convenience of a dry product.

Black Leaf 155—a "fixed" nicotine compound for spraying apples and pears to control codling moth, also for controlling grape berry moth and citrus thrips.

Black Leaf 10 Dust Base—a "free" nicotine compound, easy to mix with non-alkaline carriers to make a neutral dust.

Black Leaf Garden Dust—a multi-purpose dust or spray containing nicotine, pyrethrum and rotenone—*plus* a concentrated fungicide.

Black Leaf Rotenone Dust—1% rotenone and sulphur, blended on our special carrier material.

Black Leaf Mash-Nic—for controlling the large roundworm (*Ascaridia galli*) in chickens. A "single-shot" treatment.

Nico-Fume Liquid—contains 40% actual nicotine in a "free" form—for greenhouse spraying and fumigating to control aphids and similar sucking insects.

Nico-Fume Pressure-Fumigator—spreads penetrating nicotine fumes under pressure to control aphids and similar sucking insects in the greenhouse.

Benzo-Fume Pressure-Fumigator—for the control of greenhouse red spider mites.

Black Leaf Aerosol Insect Killer—a highly effective aerosol insecticide containing a combination of pyrethrins and piperonyl butoxide. Controls flies, mosquitoes, ants, roaches and similar household insect pests.

Black Leaf 3-5-40 Cotton Dust • Black Leaf 3-5-0 Cotton Dust
Black Leaf Toxaphene-Sulphur Dust • Black Leaf Toxaphene Dust
—for control of boll weevils, aphids, fleahoppers, thrips, boll worms, and certain other insects infesting cotton.

Other cotton insecticide materials available.

"Black Leaf"

TOBACCO BY-PRODUCTS & CHEMICAL CORPORATION
Richmond, Virginia • San Francisco, California

THE EDITOR COMMENTS

WITH the USDA announcement that neither acreage allotments nor production controls would be set on the 1951 cotton crop, the tip off is given that agricultural production in general is likely to be increased next year. Specifically, the cotton growers have been requested to increase their production to 16 million bales, which represents a considerable increase over the trimmed-down quotas of the past several years.

To the pesticide trade, this can mean but one thing: that demand for agricultural chemicals will be accelerated next season. Just how much is anyone's guess, but since the supply situation is, and is likely to continue to be uncertain, there is much to be gained by estimating next year's needs as soon as possible.

It seems hardly necessary to remind the trade that shortages of both chlorine and benzene will affect production of DDT, BHC and toxaphene, not to mention 2,4-D and other pesticides of more or less importance. Industry sources have observed that even with the demand present, it is doubtful that enough raw materials of strategic nature can be drawn away from military needs to produce adequate pesticide supplies should a major infestation come in 1951.

The defense production act gives the Department of Agriculture a key position regarding the availability of raw materials. According to the legislation, the U.S.D.A. has the responsibility of presenting to the Department of Commerce all claims for raw materials needed by the agricultural chemicals industry. Thus the quantities of materials available to the industry for the 1951 season must become available now in order to avoid that last-minute rush and the bottleneck of production which always comes when ordering is delayed.

The U.S.D.A. must have all the information possible to claim materials under allocation or other controls. And it is up to the industry to let the Department know what its needs are going to be, and to make its estimates ample to take care of the added demand which is almost sure to come.

We can give sincere backing to the program launched by the National Agricultural Chemicals Association urging the trade to buy early. The word should be passed on at all levels . . . which means that the local manufacturer and dealer should urge his customers to order early, that the others in the distribution line might know what the needs will be so that they in turn might pass on this knowledge until it gets to the final procurement stage.

Similar campaigns have been launched in past years, but this time the need appears to be of unusual importance. Order *now*!

THE passing of Clifton A. Woodrum, president of the American Plant Food Council, has cost the fertilizer industry a very staunch friend. Not only during his direct connection with the industry for the past five years, but in his 23 years as a member of Congress, his policies were always along the line of favoring private enterprise in the nation, Federal economy where possible, and a sensible approach to many of the problems of government, both social and economic.

He was a man of dignity mixed with warm friendliness which brought respect from all with whom he came in contact. His personality will be missed in many circles. His successor, unknown at this writing, will of course have the support of all his constituents, but it may take a long time for Mr. Woodrum's close associates to become accustomed to getting along without his leadership.

WITH the U.S.D.A.'s acceptance of formulas containing allethrin for aerosols, one wonders if this might not become a helpful factor in the 1951 insecticide supply. A tight situation on pyrethrum is forecast for 1951, particularly in view of possible military demands for the material. Although at present much remains to be known about allethrin, by next season it may well win a place in the pesticide armamentarium.

Desert and Green Acres

by

Elmer S. Nelson

Executive Secretary, California Fertilizer Association

WEST from the Continental Divide, sprawling between the Columbia and the Colorado Rivers lies a vast and barren land, a region of deserts. From the earliest day of fur trapper and pioneer, for more than a century, that parched and arid place became the roadbed over which men passed in their quest for wealth.

Waiting hills and river sands gave up their precious hoard of silver and gold; the forest's green mantle was stripped from mountains and in the pueblo of Los Angeles the earth was tapped to pour forth its black gold.

An abundance of free land captured imagination and gave hope to men living in cities stalked by depression and poverty. Fertile valleys beyond the Golden Gate became seas of waving grain to make California the bread basket and foremost producer of wheat in the world. Heavily cropped acres, uncared for, were soon exhausted and impoverished.

Frenzied finance, by-product of Virginia City, the Comstock, and many a boom town; the never ending migration of tourists; and the lengthening rows of orange groves, a new symbol of wealth, added to the mad scramble that wound up in the 'boom and bust' era that spiralled to a dizzy end shortly before the curtain dropped on one century and rose on another. And yet, the key to the greatest treasure of all remained untouched!

In the early part of 1900, San Francisco was the metropolis of the West; Seattle, gateway to Alaska and the Puget Sound; the Northwest spewed lumber for Tacoma mills; while Los Angeles, nurtured in a dry river wash, settled down with the coming of the twentieth century and prepared for the golden age and opportunity.

The real story of the West, however, was to be the dramatic story of water. It was to be the record of engineering and construction of the dams, canals, tunnels, and the aqueducts so the water of the Rockies might flow to the Imperial Valley; the Sacramento to irrigate the San Joaquin; the Salt River to supply the fertile soil of Arizona; the Bonneville and Grand Coulee dams unlock the riches of the Pacific Northwest. These and a host of other projects were, in two generations, interlaced

(*Please turn the Page*)

into a vast network of arteries remaking the old west.

Long before industry challenged the stronghold of agriculture, colleges and universities turned their laboratories, a large part of budget appropriations, and attention to the study of soil and crops. In California alone, where more than 250 different crops are produced, in addition to livestock which, for 1950, topped $2,000,000,000, the experiment stations, extension service, and farm advisors have influenced and reshaped today's farming.

Agricultural expansion was made possible by, (1) the unlimited supply of natural resources, (2) an abundance of free and cheap land, (3) the development of water and power for cities and farms, and (4) the impetus given to manufacturing during World War II. The phenomenal growth of population along the seacoast clearly pointed the nation's future.

Between 1900 and 1950, the three Pacific Coast states grew faster than any other section of equal size in the country. The population of Oregon increased four times; Washington, five; and California, seven times. Total U. S. population doubled. By 1950, the combined population of the three states approximated 15,000,000. Of these, 10,500,000 are living in California. The estimated increase in the three states for the decade 1950-60, ranges from a low of 17,000,000 to a high of 19,500,000. By 1960 California will have at least 13,500,000 people. At present, it ranks second to New York State.

Probable long range defense plans will again stimulate in-migration. Though others among the western states have a smaller population, similar changes are taking place.

In 1940 California's rural farm population was 9.2% of the total; Washington's was 19.3%. In Oregon 23.5% lived on farms. The rapid industrialization of the Coast, during the past decade, has increased the trend to urban and rural non-farm areas. This is more striking in California where there are more than 90 cities with a population exceeding 10,000 each.

Future expansion is expected to continue because, (1) western states will draw more people as total national population rises, (2) industrial growth has stabilized the Pacific Coast states and industry will increase with national development, (3) there are unlimited possibilities to increase potential power, agriculture, forest, water and mineral resources, (4) of the need to develop additional products of factories and farms and to extend transportation facilities to keep pace with new markets both domestic and in the entire Pacific area, and finally, (5) the inevitable long time trend to decentralize large metropolitan areas and build up rural communities.

The rapid pyramiding of population in the Pacific Coast states has altered the status and importance of Western agriculture.

Plant nutrient consumption in the Mountain states for 1949 was the lowest in the country; the Pacific states was the third lowest. The consumption of commercial fertilizers used in crop production in California was three pounds per acre in 1905. In 1920 it was 16 pounds, by 1930 the figure rose to 30 pounds, in 1940 it had jumped to 45 pounds and in 1949 amounted to 105 pounds. The all time high was in 1947, when 125 pounds of mixed commercial fertilizer was used per acre.

The extent of recent changes is well illustrated in the case of California with an area of 100,000,000 acres. Farm lands account for 35,000,000 acres; less than one-third or 9,500,000 acres being in crop production of which 5,000,000 acres is irrigated and intensively cropped. One-third of the State's area is used for pasture or grazing lands, while 600,000 acres is irrigated pasture land.

Due to the delivery of crops there is a great and growing need for planned land management.

Events of the past months, plunging the nation headlong into war economy, have again projected agriculture to the forefront. War mobilization is creating an acute shortage of labor. The spectre of farm surpluses is, overnight, displaced by a crying need for more products of the land.

The temporary lull that followed the decline of food prices in 1948, and 1949, is being supplanted with the probability of long time agricultural activity. The problems will be many but the opportunity to increase the productivity of the land will open a new era for the fertilizer industry. It is to the last frontier that slumbers between the Rockies and the Pacific Ocean where men must turn if the nation is to win in the battle for food. That untouched region, with an immense capacity to produce crops, is the challenge to the fertilizer industry. The challenge to turn a desert empire into green acres, where millions of Americans will make their homes and their living.

Tremendous gains seen in California's consumption of fertilizer materials and in agricultural production of food and fiber. Future expansion likely for many years, throughout entire area, Nelson says.

Refined BHC for Wireworm in tomato . . . . no off-flavor

by

Stephen R. Morgan[1]
and
Torrey Lyons[2]

WIREWORM damage to young transplants caused by *Limonius* spp. has been observed in most of the important tomato growing districts in California. Although the damage rarely extends over an entire field, but is usually confined to smaller areas within the field, yet many such infested areas are damaged seriously enough to result in complete loss of the stand. This requires a considerable expenditure in replanting and there is no guarantee that damage will not occur again in the new planting. In some cases the grower must either abandon the wireworm-infested land or treat with some chemical for control. "DD" (1,2-dichloropropane, 1,3-dichloropropene) or "EDB" (ethylene di bromide) has been used successfully but the cost of treatment is sufficiently high to prompt growers to produce crops other than tomatoes.

Experimentation with benzene hexachloride indicated that it would kill wireworm larvae, when used as a soil or plant treatment at the time transplants are set into the field. In 1947 many ways of using the material were tried. This included dusting and dipping the transplants, dusting and dipping potatoes used as a trap crop, pouring on a dilute suspension at the base of plants and adding the insecticide to the planting water.

The most effective treatments were very small concentrations of BHC in the planting water. The problem of possible off-flavor was then taken under consideration.

It was known that benzene hexachloride had not been recommended for use on food plants because many of the previous commercial preparations imparted off-flavors. O'Kane (1947), reported objectionable flavor in potatoes, peas and sweet corn that had been treated with the material. A musty off-flavor was detected in samples of canned peaches, when they had been sprayed with benzene hexachloride approximately 60 days before harvest. (Davis 1948). Lamb, in an unpublished report observed off-flavor resulting from BHC treatments in processed lima beans, spinach and tomatoes. Lange, et al, (1948), found that certain tasters could detect the purified material in tomatoes when used in soil treatments in dosages as low as ¼ to ½ lb. of gamma isomer per acre. Stitt, (1949), reported that soil surface treatments using benzene hexachloride definitely caused an off-flavor in fresh peas and pole beans. But he also reports that off-flavor in fresh samples of vegetables grown in the high gamma type benzene hexachloride was less noticeable than those treated with crude benzene hexachloride.

Because BHC showed promise of effective control of wireworms in tomato transplants, trials were undertaken to determine if proper use of lindane, the pure gamma isomer of benzene hexachloride would control wireworms economically and efficiently without imparting off-flavor to processed tomatoes. Effect of the treatments on the plants was also noted.

Investigations Made

EXPERIMENTAL trials were conducted during the 1948 and 1949 tomato growing seasons. Treatments were applied on several different soil types since varied soil types might influence results. The materials used in these trials were "Isotox Wettable No. 250," a wettable powder containg 25% of the highly refined gamma isomer of benzene hexachloride, and "Isotox Seed Treater No. 75," wettable powder containing 75% of the purified material.*

Medium sized transplants, 8 to 10 inches high of the improved Pearson canning variety were used in all trials and the usual commercial planting practice was followed. A tomato planter opens a furrow for the plants and at the same time discharges water into the furrow from a tank on the planter. This operation requires from 500 to 900 gallons per acre. In all trials the insecticide was added to the planting water.

1 Agriculturist for Liberty, CFD Division
2 Farm Advisor, Univ. of Calif. Extension Service, Sacramento

* Isotox Wettable No. 250 and Isotox Seed Treater No. 75 are manufactured and supplied by California Spray-Chemical Corp. These materials are now classified as "Lindane."

Trial No. 1 was conducted on a shallow phase Columbia silty clay loam in the Natomas-gardenland district, Sacramento County. Transplants were set out between May 5th to May 10th, with a one-row, 300 gallon planter. The tank was thoroughly agitated following addition of insecticide. When planting, a continuous water flow of the suspended insecticide was dispersed at the surface and at the planting depth. Approximately 600 gallons per acre of planting water was used in all treatments. The distance between the rows was 5.5 feet, and the plants were set 2 feet apart in the rows. There were four rows in each treatment and each row was 266 feet long. Treatments were not replicated.

No effect could be seen on the plants at any time. Although the treated rows appeared to have less plant loss than the untreated rows, counts were not taken because other common causes of plant loss were operating. These included poor plants, injured plants, hard spots in the field and a hot north wind following planting.

On September 4, one box of tomatoes was picked from each treatment. Two to three fruits were taken from each row at intervals of 12 feet.

These samples were processed as follows: the fruit was washed in cold water for several minutes; then heated or blanched for 20 to 30 seconds at 290° F., cored and peeled and placed in a #2½ size container. Tomato juice was added containing 0.07% salt, and the sealed cans were then subjected to a 205° F. temperature in a continuous cooker and cooler for 32 minutes. In all subsequent trials the same procedure was followed.

No off-flavor could be detected in any of the above treatments. Samples were heated and tasted 6 weeks and 3 months and again 4 months after processing. As in the case of all treatments and trials the processed product was tried by two groups of 9 persons, each with considerable quality grading experience. The samples were coded and unknown to the testers.

Table 1

Dosages of "Isotox" No. 250 and "Isotox" No. 75 used in trial 1.

Treatments	Oz. per 100 gallons 75% material	Oz. per 100 gallons of 25% material	Oz. per acre of pure gamma isomer
X (untreated)	0	0	0
A	.33	–	1.5
B	.50	–	2.25
C	.83	–	3.75
D	–	1	1.5
E	–	2	3.0
F	–	3	4.5
G	–	4	6.0

Table 2

Dosage of "Isotox" Seed Treater No. 75 used in Trial III and the average plant loss per row.

Treatments	Oz. 100 gal. of 75% material	Oz. of 75% material used per acre	Pure gamma isomer per acre ounces	Average number of plants lost per row
X (untreated)	0	0	0	54.0
A	.33	1.78	1.3	31.0
B	1.0	5.4	13.3	23.5
C	3.0	17.8	4.0	27.5

Table 3

Dosages of "Isotox" Seed Treater No. 75 used in Trial IV.

Treatments	Oz. per 100 gal. of 75% material	Oz. of 75% material used per acre	Pure gamma isomer per acre, ozs.
X (untreated)	0	0	0
A	0.17	1.35	1
B	0.33	2.7	2
C	0.66	5.4	4
D	2.66	21.6	16

Trial II was located on Columbia clay, shallow phase, over Sacramento soil in the Walnut Grove-Delta district, Sacramento county. Transplanting and treatment began May 9th. The distance between the rows was 6 feet, and the plants were set 2½ feet apart in the rows. The 75% wettable powder was used at the rate of 1 ounce per 100 gallons of water. The solution was agitated in a two-row 640 gallon planter tank and the suspended material supplied in a continuous flow to the surface and planting depth. The rate of application varied from 600 to 800 gallons per acre, making the rate of gamma isomer 4½ to 6 ounces per acre. There were four rows in the treatment, each row 1500 feet long, replicated three times.

There was no visible effect upon the plants at any time.

The ranch where Trial II plots were located, had a very active wireworm infestation which destroyed a large number of transplants. Over a two year period, untreated areas showed losses ranging from 5 to 47%; treated areas showed losses from 1 to 3%.

On September 21, 4 boxes of tomatoes were picked from each replication in the same manner as in Trial I and processed. Sample cutouts did not reveal any off-flavors.

Trial III was conducted on Egbert muck, on Tyler Island, Sacra-

mento River Delta, Sacramento county. Transplants were set out May 3. The distance between the rows was 5 feet and the plants were spaced 3½ feet apart in the rows. A single row, 130 gallon planter was used. The solution was agitated with a wooden paddle during planting. 540 gallons of water was the rate per acre on all plots. There were two replications of two single rows, each 1000 feet in length.

Wireworms were the main factor in plant loss in the untreated rows. In all rows, plants were lost because of saline soil, dry ground and injured plants. There was no apparent plant injury from any of the treatments.

Samples were harvested on October 5th, one box of tomatoes was picked from each treatment from the entire length of the rows. After processing, sample cutouts revealed no off-flavors.

In the fourth trial, the plots were conducted on Hanford very fine sandy loam located in the Consumnes River bottom near Elk Grove, Sacramento county. Wettable 75% material at four different rates was dispersed in planting water from a single row 100 gallon planter. Approximately 800 gallons of water per acre was used in all plots. The plots were single rows, 800 feet long, replicated four times.

The effect on wireworms could not be measured since no wireworms appeared.

Treatment D, in which one pound of pure gamma isomer was used per acre, definitely affected the plants. Wilting and stunting occurred and eventually most plants died, however, enough remained to produce fruit for sampling. Treatment C, in which four ounces of pure gamma isomer was used per acre appeared at first to suspend the initial growth of the plants, but 10 days later this condition ceased and no further influence on growth was noted. Other treatments showed no effect on the plants.

On October 4th, samples were picked at intervals along the entire length of the rows and processed. Sample cutouts revealed no off-flavor in the finished product.

Summary

The results obtained from several experiments were a continuation of a program initiated during 1947, with a technical grade of benzene hexachloride. This product is not recommended for use on many types of food plants because of possible translocation of off-flavors.

Small amounts of "Isotox Wettable No. 250," containing 25% gamma isomer and "Isotox Seed Treater No. 75," containing 75% isomer when added to the transplant water resulted in good control of wireworms and no off-flavor could be detected in fresh or processed tomatoes.

Results indicate that 2 ounces of the pure gamma isomer should be used per acre, which is the equivalent of 8 ounces of the 25% or 2.7 ounces of the 75% material.

When used at the suggested rates the materials had no apparent effect on the tomato plants or production. Where 4 ounces of gamma isomer was used per acre in sandy soil, there may have been a short period of slow growth. However, these plants grew normally and produced abundantly. The highest rate of treatment per acre used, (16 ounces of gamma isomer) resulted in wilting, stunting and eventual death of most of the tomato plants. Other treatments on this soil had no apparent

(*Turn to Page 81*)

Below: Wireworm damage to tomatoes on untreated plot. Application of high gamma isomer BHC gives good control of this pest.

New Problems Discussed at 4 Successive Meetings of

CONTROL OFFICIALS

WITH registrations surpassing previous marks, four groups of state control officials met at the Shoreham Hotel, Washington, D. C., October 1-6. The groups: Association of Official Agricutural Chemists; Association of American Feed Control Officials; Association of American Fertilizer Control Officials; and the Association of Economic Poisons Control Officials.

Officers Named

EACH group elected officers at its annual meeting. The A.O.A.C., gathering the first two days of the week, named the following:

President, H. A. Halverson, St. Paul Minn., to succeed W. A. Queen, F. D. A., Washington; vice-president, W. B. White, F. D. A., Washington, to succeed Mr. Halvorson. Secretary-treasurer will continue to be Henry A. Lepper, FDA, Washington.

The A.O.A.C. also elected the executive committee, H. L. Fisher, New Haven, Conn.; E. L. Griffin, U. S. D. A., Washington and W. F. Reindollar, Baltimore, Md. Mr. Queen, as ex-president, becomes an ex-officio member of the committee.

The feed control officials elected the following for 1951:

President, M. P. Ethridge, Mississippi State College. Vice-president, Forrest W. Quackenbush, Purdue University, Lafayette, Ind. Secretary-treasurer, L. E. Bopst, University of Maryland, College Park. Mr. Bopst was re-elected to continue his duties as he has done for many years.

The fertilizer control officials elected as follows:

President: Rodney Berry, director of the division of chemistry and State chemist of Virginia, Richmond. Mr. Berry succeeds John B. Smith, Kingston, R. I. Vice-president: Park A. Yeats, Oklahoma City, Okla., to succeed Mr. Berry. Secretary-treasurer, Bruce D. Cloaninger, Clemson, S. C., who was re-elected.

The Economic Poisons Control Officials named the following officers for 1951:

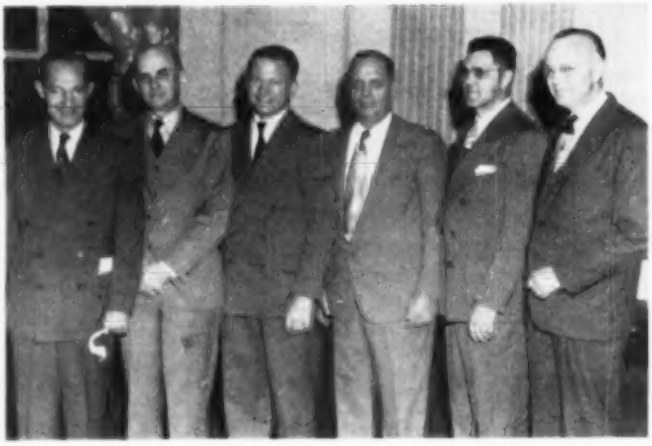
President, Allen B. Lemmon, Sacramento, California, to succeed J. F. Fudge, College Station, Texas.

Vice-president, E. W. Constable, Raleigh, N. C., to succeed Mr. Lemmon.

Secretary-treasurer, A. B. Heagy, College Park Md., who was re-elected.

Elected to the executive committee was Floyd Roberts, North Dakota State Chemist, and Rodney Berry, Richmond, Va. Dr. Fudge, as past president, becomes an ex-officio member of the board. These men replace Henry J. Hoffmann, St. Paul, Minn. and A. B. Bucholz, Albany, N. Y. on the committee.

According to Henry A.



Officers of the Association of Economic Poisons Control Officials: (L. to R.): Rodney Berry, executive committee; E. W. Constable, vice-president; Allen B. Lemmon, president; J. F. Fudge, ex-officio member of executive committee; A. B. Heagy, secretary-treasurer; and J. D. Patterson, executive committee member. Absent when picture was taken, were Floyd Roberts, N. Dakota State chemist and W. G. Reed, U. S. Dept. of Agriculture, executive committee members.

Dr. B. E. Conley, representing American Medical Ass'n. Committee on Pesticides.

Dr. A. B. Heagy, Sect'y-treasurer of A.E.P.C.O. on platform with speaker Dr. J. H. Townsend, U.S.D.A.

Lepper, Food and Drug Administration, Washington, secretary of the A.O.A.C., registration for that group's convention was over 500; the largest in its history. Speakers on the program included: K. D. Jacob, H. R. Allen, W. L. Hill, H. A. Davis, Gordon Hart, N. J. Halbrook, O. W. Ford, and F. W. Quackenbush on fertilizer sampling; and J. B. LaClaie, T. H. Harris, A. B. Heagy, R. L. Caswell, H. A. Rooney, W. A. Affens and J. J. T. Graham, on economic poisons.

Registration for the American Association of Feed Control Officials was likewise of record proportions, according to Mr. Bopst, secretary.

Fertilizer Officials

IMPORTANT discussions of current problems in the fertilizer field were part of the program of the fertilizer control officials on Friday. Although the sudden death of Clifton A. Woodrum created a general pall over the activities of the day, the program was carried out.

Retiring president John B. Smith, in his annual address, reviewed the activities of the Association during the past year, commenting on new state legislation and pointing out areas where new laws are being introduced. He observed that there are many factors involved in planning uniform regulations, reminding that absolute uniformity is not to be desired because of differing conditions in various sections of the country. He said that conditions calling for certain types

Fertilizer Control Officials officers. Front row (L. to R.): J. F. Fudge, executive committee, Rodney Berry, president; John B. Smith, retiring president. (Back row) G. W. Michael, executive committee; B. D. Cloaninger, secretary-treasurer; and J. D. Patterson, executive committee. Not shown in picture: Park A. Yeats and Wm. Thompson, executive committee.

Wm. O. Buettner, on platform delivering his address to A.E.P.C.O.

E. A. Epps, Baton Rouge, La. and M. P. Ethridge, newly-elected president of Feed Control Officials.

of regulation are not necessarily bounded by state lines, but rather, by agricultural regions.

Dr. Russell Coleman, speaking for the National Fertilizer Association, of which he is president, reviewed the supply situation briefly, describing the productive capacity of the industry as being "good." He said that the capacity for production of nitrogen is up 15%, and American production capacity for potash is estimated to be up from 8 to 10%. For superphosphate, however, the supply picture is somewhat blurred by the possibility of government demands for sulfur in non-agricultural use. As to allocations, Dr. Coleman reported that machinery has been set up for this when and if such steps are necessary.

The storage problem, the NEA head reminded, is still a big factor. The fertilizer material must move from factory to farm as soon as possible, he declared, to keep the distribution from breaking down because of lack of storage space.

Summing up the supply situation, Dr. Coleman observed that adequate supplies can be counted on to be available only if present industry plans can be carried out without undue interference.

A strong rebuttal to organic fertilizer enthusiasts who condemn use of any commercial materials in agriculture, was presented by Dr. Kenneth C. Beeson, Cornell University, Ithaca, N. Y. In his paper, "Comparative Effects of Organic and Inorganic Fertilizers on Nutritional Quality of Crops," he pointed out emphatically that there are absolutely no scientific grounds for statements that superior nutrition in crops is obtained via the use of organic matter to the exclusion of all other types of plant food. He said that the relationship between fertile soil and human health is very real, but pointed out that under the complex system of distributing foodstuffs it is impossible to find any whole community which is entirely selfsufficient from the standpoint of raising its own food. Thus, the variable factors are so numerous that a scientific attempt to measure the nutritive value of even one crop is not possible.

Minor elements in the soil are of increasing importance, the Cornell scientist said, and where they are lacking in a particular area they can never become a part of the soil's store by the organic fertilizer method when vegetation grown in the area is returned as compost. "This lack goes on ad infinitum," he remarked.

The difficulty in refuting the the claims of pseudoscientific literature on the subject of organic fertilizer lies in the fact that the careful and competent researcher is reluctant to publish his findings in imcomplete form, realizing that many facts are not yet known, and that when more data has been uncovererd, the picture might be altered.

The less conscientious and irresponsible pseudoscientist, he said, jumps to conclusions from one experiment, ignoring the unknown factors . . . adds "facts" which contribute to his story, and combines these "findings" with half-truths to form reports which blame commercial fertilizers for human ills, foot and mouth disease in cattle, and with a general disruption of human progress.

Walter Scholl and H. M. Wallace, U. S. D. A., Washington, discussed the composition of mixed fertilizers in relation to guarantees; and Dr. H. L. Dunton, head of the Department of Agronomy, V. P. I. described the development of the pasture program in Virginia. Dr. S. F. Thornton, F. S. Royster Guano Co., Norfolk, Va., spoke on the history and present status of the Magruder sample in fertilizer control; while L. C. Jacobs, Nashville, Tenn., discussed the reporting system vs. tax tags, to complete the program of the morning.

Fertilizer & Insecticides

DR. M. D. Farrar, department of entomology and zoology, Clemson Agricultural College, Clemson, S. C., presented a paper on "Insecticides in Fertilizers." Dr. Farrar said the introduction of the chlorinated hydrocarbons as insecticides brought about a new era for the control of insects that feed in the soil. Previously, sterilization with steam, injections of fumigants, or the addition of arsenical poisons to soils were used for their control, but these methods were unsatisfactory due to high cost and low efficiency. At best they proved only partially effective and repeated treatments were often necessary. He stated further that fields treated with insecticide-fertilizer mixtures have, in many cases, shown tremendous response in increased crop stand and production." Farm demonstrations have been so outstanding that farmers have requested the fertilizer manufacturers to mix insecticides with their fertilizer, but this practice is not in conformity with fertilizer laws or regulations," he pointed out. "To permit the addition of insecticides to a fertilizer mixture, several states have now issued regulations governing the added chemicals in the mixture. Generally the regulations require the bags to be marked or tagged to show the weight of chemical added to each bag."

A.E.P.C.O. Sessions

COMPLETING the week's activities, the Association of Economic Poisons Control Officials held its fourth annual meeting on Saturday. Retiring president J. F. Fudge, in his address, pointed out the work of the Association during the past 12 months re-emphasizing the importance of more uniformity in state regulations, but at the same time observing that "absolute" uniformity is not to be desired due to the different problems in varying sections of the nation. He told of progress toward simplified registration in many places, and emphasized the need for additional common names to apply to insecticides. He commended the work of the committee on nomenclature for its success in finding acceptable names for several of the compounds whose chemical names are too involved for practical use in designation.

Dr. Fudge reminded that undue haste in marketing various pesticides before enough is known about their toxicity and residual properties, is inviting trouble. He referred to statements made in 1948 by Dr. S. A. Rohwer, where the latter said that the

Photos above: (L to R) C. H. Jefferson, Ontario Dept. of Agriculture, Ottawa, Ont., Canada; Dr. Donald E. H. Frear, Pennsylvania State College, State College, Pa. (Second photo): Dr. H. H. Shepard, U.S.D.A. Office of Materials Facilities, Washington, D. C.; Donald G. Lerch, Jr., National Agricultural Chemicals Association editor, Washington, D. C.; R. L. Cherry, "Oil Paint & Drug Reporter," New York; and Joseph Noone, National Agricultural Chemicals Association.

Third Dr. Fred C. Bishopp, assistant chief, Bureau of Entomology and Plant Quarantine, U.S.D.A., Washington, D. C. Last photo: Henry R. Walls, University of Maryland, College Park, at registration desk with Allen B. Lemmon, Sacramento, California, newly-elected president of the A.E.P.C.O.

industry should "make haste slowly" in introducing new materials.

The AEPCO president said that the Association performs a double duty: first, seeing that the sale and use of pesticides are controlled adequately; and second, to see that the best results are obtained with the materials when used, so that groups with divergent opinions may be satisfied. Example: 2,4-D as viewed by rice growers vs the outlook of cotton farmers toward the herbicide.

Amplifying the differences of opinion regarding pesticides, the speaker pointed out that manufacturers and custom operators are often careless in spite of known dangers of toxicants. Consequently, persons who do not use these chemicals are becoming louder in their demands that the products be outlawed. Individuals who do use them, on the other hand, are equally insistent that farming and the raising of adequate crops cannot be done successfully without the use of these chemical aids. "The outcome is still in doubt," he observed.

However, he warned that we must not lose sight of the great value of pesticides in the agricultural economy. Rice producers are largely dependent on 2,4-D; apple growers in the Pacific Northwest are almost entirely dependent on pesticides. In Utah, he said, the yield of alfalfa hay was doubled and seed yield increased six times when pesticides were used properly. "Every dollar spent on pesticidal control of grasshoppers and greenbugs has meant many dollars worth of saved crops, and in many cases, made the difference between good crops and no crops." Proper use of effective pesticides is an absolutely

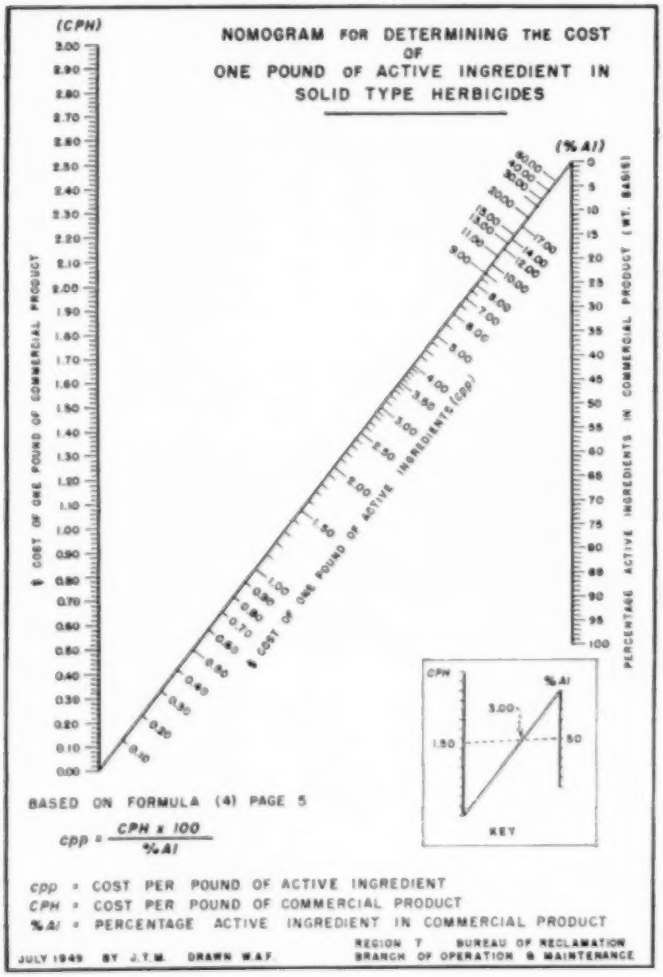
Below: General view of banquet held by National Fertilizer Association at the Mayflower Hotel in honor of fertilizer control officials. Similar event by American Plant Food Council scheduled for next evening was cancelled upon the death of Clifton A. Woodrum. Incidentally, this photo, showing Mr. Woodrum fourth from left at the speakers' table, was the last one ever taken of him. (Associated Press Photo via Nat'l Fertilizer Ass'n.)

A Helpful tool in purchasing herbicides:

Weed Control Calculations

RESULTS obtained by application of weed control chemicals are dependent upon several important factors. These include the susceptibility of the plant to the chemical, the time of application (stage of plant growth), plant environment (climate and soil conditions), and of course, the concentration and rate of chemical application. Some control can be exercised over each of these factors. A specific chemical can be chosen to "kill" a particular plant; the time of application can be chosen; plant environment, though least susceptible to control, can be modified, for example, by an irrigation; and lastly correct calculations, proper equipment and good operation can control rate of application within desired limits. The solution of weed control and eradication problems will often require consideration of all the four factors involved. Indeed weed research is being conducted actively in an attempt to evaluate the influence exerted by each item on the solution of a particular problem. Once this research is accomplished and proven methods become available, calculations must be made to insure that application of the herbicide is done as prescribed. Thus if weed control chemicals are to be applied both *effectively* and *economically*, it is necessary to have an understanding of the calculations involved.

Figure 1



Necessary Calculations

THE basic calculations which arise when weed control chemicals are used may be listed as follows: (1) Purchase of herbicides—cost per unit weight of active ingredients. (2) Calculation of solution concentration. (3) Calculation of rate of application—spray rig calibration and preparation of herbicide solution. (4) Conversions between gallonage, concentration, and rate of application and (5) Calculations involving applications of herbicides in flowing water—waterweed and algae control problems. In this article basic definitions and calculations are presented, com-

by

John T. Maletic*

mon to many application problems plus the computation involved when weed control chemicals are purchased.

Definitions: ppm and %

CONCENTRATIONS of herbicide solutions are often reported in terms of parts per million (abbreviated ppm) and percent. Parts per million refers to the number of parts by weight or volume of a constituent in 1,000,000 parts of diluent by weight or volume. An important distinction is to be noted in this definition. Parts per million may be expressed on a weight basis as, for example, 1,000 pounds of herbicide in 1,000,000 pounds of water. Similarly a volume basis could be used such as 1,000 gallons of herbicide in 1,000,000 gallons of water. In both these cases the concentration would be referred to as 1,000 ppm. Clearly though, 1,000 ppm would be ambiguous unless it was stated on what basis it was computed. It is recommended, then, that one should state the base being used when parts per million are used to report concentrations, e.g. 1,000 ppm by weight or 1,000 ppm by volume.

When percent is used to report the concentration of solutions it refers to the number of parts of constituent in 100 parts of diluent. The weight and volume distinction applies to percent just as it does to parts per million. Hence, referring to the preceding examples, it could be stated 0.10% by weight or 0.10% by volume.

From the foregoing we can see that the two methods of concentration reporting are simply related. Given the concentration in ppm, we need only to divide by 10,000 to obtain the concentration in percent. Conversely, given the percent, we multiply by 10,000 to obtain ppm.

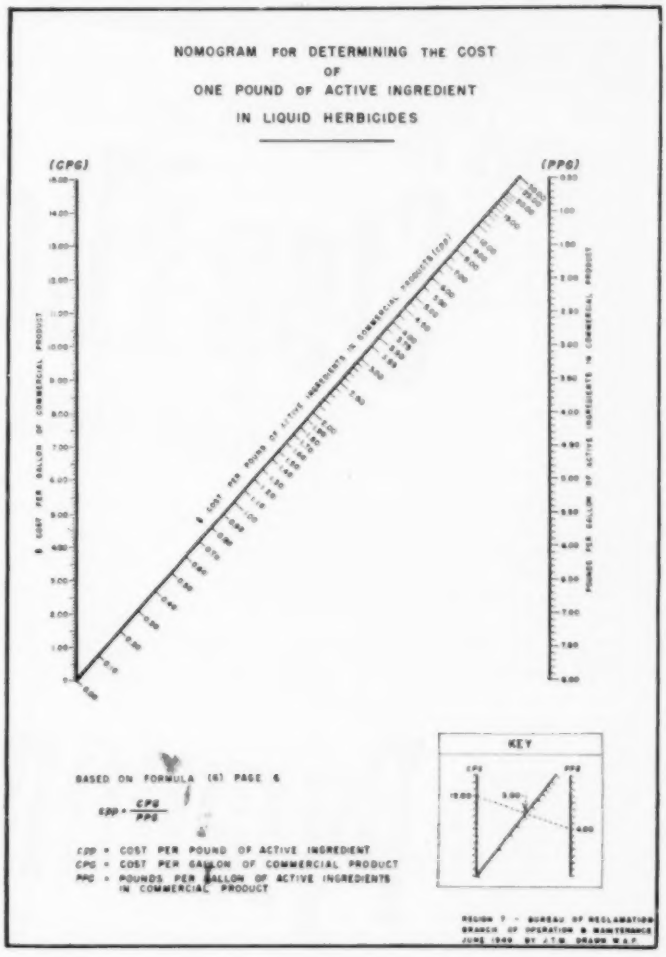
In the discussion of percent one further distinction should be made. That is, a percentage is used to designate the ratio of the part to the whole. Note that in reporting concentrations as given in previous paragraphs we were not referring to the ratio of the part to the whole. The following example will make this clear. Manufacturers of herbicides frequently report the percentage active ingredients by weight in their products. On this basis if a herbicide weighs 10.34 pounds and contains 40% active ingredients we would readily compute the pounds active ingredient per gallon by simply multiplying 10.34 and 0.40 obtaining 4.136 pounds per gallon. Note, then, that percentage active ingredients in this case was computed as follows:

$$\frac{4.136}{4.136 + 6.204} \times 100 =$$

$$\frac{4.136 \times 100}{10.340} = 40\%$$

In comparison with the use of percent as previously defined, the con-

Figure II



* Soil, Scientist, Region 7, Bureau of Reclamation.

WHAT'S THE ONE SURE WAY TO Stop Flies WITHOUT DANGERS OR DIFFICULTIES?

Answer: Base your insecticide on *Pyrenones. Pyrenone-based insecticides kill horn flies, stable flies, deer flies, houseflies—even the highly resistant horsefly. With Pyrenones, you can make insecticides which offer no hazards to milk or meat and are free from skin irritants and unpleasant odors.**

Give *your* dairy insecticides these sales "pluses." Base them on Pyrenones and cash in on the hard-selling nationwide advertising, publicity, and promotion campaigns that are keeping Pyrenone-based insecticides *first* in the minds of *your* customer — the dairy farmer.

For information, write: *U. S. Industrial Chemicals, Inc., 60 East 42nd Street, New York 17, New York. Branches in all principal cities.*

Pyrenone*

*Registered U. S. Patent Office

centration of active ingredient in the above herbicides would be computed as follows:

$$\frac{4.136}{6.204} \times 100 = 66.6\%$$

This later value expresses the number of parts of active ingredient in 100 parts of diluent.

Specific Gravity

SPECIFIC gravity values are frequently used in herbicide solution problems to convert weights to volumes or vice versa. Specific gravity is defined as the ratio of the mass of a body to a mass of an equal volume of water at 4° Centigrade or other specified temperature. For weed control work a convenient temperature to use is 15° C. (59° F). At this temperature a gallon of water weighs 8.338 pounds; hence, for practical work, the weight of a gallon of water can be taken at 8.34 pounds. The specific gravity of a herbicide can thus be computed by the simple ratio:

$$SGH = \frac{WGH}{8.34} \text{ or}$$

$$WGH = SGH \times 8.34$$

where SGH = specific gravity of herbicide

WGH = weight per gallon of herbicide in *pounds*.

Since the specific gravity is a ratio, any unit volume and any unit weight may be used in its computation . . . the only requirement is that the weight and volume of the herbicide be expressed in the same units as the weight and volume of water.

Purchase of Herbicides

WHERE research has shown that the effectiveness of a herbicide can be measured in terms of a particular type of active ingredient, the herbicide should be purchased on the basis of the cost per unit weight of active ingredients. Recommendations for use of 2,4D, for example, are made on the basis of the pounds of 2,4D *acid* applied per acre. Hence, when purchasing 2,4D, it is wise to compute the cost of a pound of 2,4D acid in the product. Similarly for other materials the cost per pound of active ingredients should be determined.

When the herbicide being purchased is a solid, the following formula can be used:

$$(1)\ CPP = \frac{CPH \times 100}{\%AI}$$

where CPP = Cost per pound of active ingredient

CPH = Cost per pound of herbicide

%AI = Percentage active ingredient

When liquid herbicides are being purchased, the following relationship will give the cost per pound of active ingredient:

$$(2)\ CPP = \frac{CPG \times 100}{WGH \times \%\ AI}$$

where CPP = Cost per pound of active ingredient

CPG = Cost per gallon of herbicide

WGH = Weight per gallon of herbicide in pounds

%AI = Percentage of active ingredient in herbicide weight basis

In many cases, especially with 2,4D, the pounds of 2,4D acid are given on the labels or can be readily computed. Where this information is known, the cost per pound of acid in a liquid herbicide can be computed from the formula:

$$(3)\ CPP = \frac{CPG}{PPG}$$

where CPP = Cost per pound of active ingredient

CPG = Cost per gallon of herbicide

PPG = pounds per gallon of active ingredient in herbicide

In making the purchase there are other factors which should be considered besides those entering the above formulas. For instance, the cost computed should be the *delivered* cost per pound of active ingredient. Furthermore, in some cases the chemical form of the active ingredient, or the carrier for that form may increase the effectiveness of the herbicide. This is particularly true for 2,4D in some areas. For example, F. L. Timmons* in his publication "Controlling Weeds with 2,4D in the Southern Great Plains" recommends for many situations the use of about one-half the amount of 2,4D acid when applied as an ester as compared with amine and sodium salts. This factor should be considered definitely when costs of esters are being compared with amines and sodium salts in the Southern Great Plains. This would be done by simply using half the cost of the ester products for comparison with the full costs of the amine and sodium salts. Possible injury to desirable plants and stability under varied storage conditions are other considerations. One can summarize by stating that when weed control chemicals are being purchased, the one should be chosen which is most likely to give the best kill, which is best suited to environmental conditions, most stable in storage and least in cost measured on a per unit weight of active ingredient basis.

When all other factors are equal, the nomograms presented herewith may be used rapidly to choose the best buy. The nomograms solve formulas (1) and (3) presented above. To use Figure 2 to determine the cost of one pound of active ingredients in solid type herbicides, it is necessary to know the cost of one pound of the commercial product and its percentage of active ingredients. These values appear on the two outer vertical scales and, by simply connecting these values with a straightedge, the cost per pound of active ingredients may be read off at the intersection on the diagonal line. For example given CPH = $2.80 and %AI = 70 . . . connect $2.80 on CPH scale with 70 on %AI scale and read the answer $4.00 on the CPP scale. Figure 2 is used in a similar manner when *liquid* herbicides are being purchased. To use this

* Agronomist, Bureau of Plant Industry, Soils and Agricultural Engineering, U.S.D.A.

(*Turn to Page* 82)

Agricultural DILUENTS

by
Roy E. Miller
President, Miller Products Company
Portland, Oregon

Part I

THE general conception of agricultural diluents is that they merely occupy space, are inert, and are unimportant. To the contrary, experiments by Wilson and Janes (1942), Campau and Wilson (1944) show that the *successful* control of the pea aphid with rotenone dust is largely dependent on the well selected diluent used. Controls obtained with other insecticides are likewise affected by proper selection of the diluent.

According to Goodwin et al (1944), the fungicidal and insecticidal dusts were made in the past with little or no regard for the chemical and physical properties of the diluent. Not until recently have entomologists and pathologists come to the realization that the so-called "inert" diluents are nearly as important to the proper compounding and performance of such dusts as are the active ingredients.

Definition

AGRICULTURAL diluents, also known as dispersants, extenders, or carriers, are the so-called "inert" materials used for diluting insecticides, fungicides, and herbicides. The common conception is that these dispersants or diluents are restricted to the field of insecticidal dusts. This, of course, is not entirely true since we have today a number of wettable spray powders which contain various diluents. Agricultural diluents are also used in formulating fertilizers. Some diluents such as sulphur, gypsum, and the lime products are also used as soil amendments. Sulphur may be used as an agricultural diluent, or it may be used as an active fungicide or insecticide.

Classification

AGRICULTURAL diluents were originally classified by Dana (1932) and this classification was modified or changed by Dake (1938); Watkins and Norton (1947); and Moretti (1947). The following represents a combination and modification of these classifications:

Botanical flours: these include walnut shell flower; tree bark powdered, tobacco flower and soybean flower.

Non-metallic minerals include familiar names such as the silicates (mica and talcs); pyrophyllite, pumicite, clays, silicas, lime products and miscellaneous diluents such as gypsum, ground phosphate rock and sulfur.

Sub-dividing further, terms describing different types of talc include fibrous, foliated, granular and compact; and clays are placed in the categories of bentonite, kaolinite, attapulgite and unclassified. Silicas are described as tripolite and diatomite, while lime products are divided into hydrated and ground limestone.

Use of Diluents

THE botanical flours are generally limited in their use and are of restricted importance. The silicates and silicas represent by far the great majority of non-metallic mineral diluents used by the agricultural trade. According to Watkins (1947), one-third of the agricultural diluents used in insecticide dusts are talcs. Wilson and janes (1942) stressed the importance and effectiveness of pyrophyllite as a diluent in rotenone dusts.

Watkins and Norton (1941) state that the majority of the clays used as agricultural diluents fall in the kaolinite group. The bentonite

group, swelling and non-swelling, are for relatively restricted use. In the attapulgite group is the first clay, ("Attaclay") found to have other than a micaceous structure. Because of their absorbing powers, certain clays such as the above are used in formulating wettable powders.

In the lime products, hydrated lime is used extensively in the manufacture of nicotine dusts and monohydrated copper dusts. Ground limestones have possibilities as diluents that have been only partially investigated.

Partially dessicated gypsum or calcined mixtures of gypsum and diatomite and calcined pumicite or volcanic ash, ("Frianite-HP") are finding increased use in the manufacture of tetraethyl pyrophosphate dusts.

Factors in Effectiveness

THERE are many factors that determine the effectiveness of agricultural diluents. Many of these factors "dove-tail" into one another in close relationship.

The following represent some of the most important factors modifying the effectiveness of agricultural diluents. These factors are listed in the order of importance from the dust manufacturer's point of view. This does not in any way signify their actual or scientific relationship.

1. *Particle Size*—degree of fineness
2. *Density*—Specific weight
3. *Fluidity*—flowability
4. *Moisture*—Climatic or inherent
5. *pH*—degree of acidity or alkalinity
6. *Absorbing Power*—power to take up liquids
7. *Compatibility*—chemical and physical
8. *Adhesiveness*—sticking power
9. *Specificity*—diluent individuality
10. *Particle Shape*—physical nature of particle
11. *Toxicity*—killing power
12. *Electrostatic Charge*
13. *Amount Used*
14. *Mixing*—uniform blending

Particle Size

ONE of the very first specifications many dust manufacturers check, in considering a prospective agricultural diluent, is its relative degree of fineness. In fact, many diluents are ordered with a specification of 95% or more through 325 mesh (44 microns), or 95% through 200 mesh (74 microns).

That these specifications are not very reliable was noted by Campau and Wilson (1944) who reported the percent of diluent passing through a 325 mesh sieve and its bulking value were little indication of the amount of the very fine particles actually present in the diluent. Goodhue (1938) found this held true for so-called 325 mesh sulphur.

Janes and Wilson (1944) state that when different samples of nonmetallic mineral diluents were ground to pass through a 325 mesh screen and were used as dispersants, they were found to give *consistent differences* in the toxic value of rotenone dusts used in pea aphid control. Some tend to increase, while others tend to reduce the toxicity of rotenone bearing dusts.

Tests with pyrophyllite ("Pyrax") in rotenone dust were as follows:

Pyrax 40 microns was quite effective;

Pyrax 16 microns not as good;

Pyrax 1 to 2 micron (fineness of clay), the toxicity of the rotenone dusts was greatly reduced. Talc samples, in which the majority of particles were clay-like in size (1 to 2 microns) were *always poor*.

Chiu (1939) tested three samples of crystalline silica against the grain weevil: extra fine (37%—10 microns) fine (13%—10 microns), coarse (0%—10 microns). The toxicity increased as the particle size decreased. Particles of more than 37 microns in diameter were of little value in control. He found a similar correlation between toxicity and particle size of the "inert" in control of the bean weevil. Higher insecticidal efficiency was obtained with finer particles.

Potts (1946) determined that particle size and weight or density have a direct bearing on distribution and deposit of a diluent dust. The composition of the dust cloud is dependent upon the particle size. Dust clouds consist of mixtures of individual diluent particles and dust groups. The dust groups may consist of 25 to 300 individual particles, which groups settle on the leaf surfaces but *do not stick* well.

Campau and Wilson (1944) noted that dispersants with large particles, up to 40 microns in size, gave better coverage and a more even distribution on plants and aphids than dispersants with particles 2 microns or less. The effectiveness of rotenone dusts used against the pea aphid was directly correlated with even distribution and good coverage.

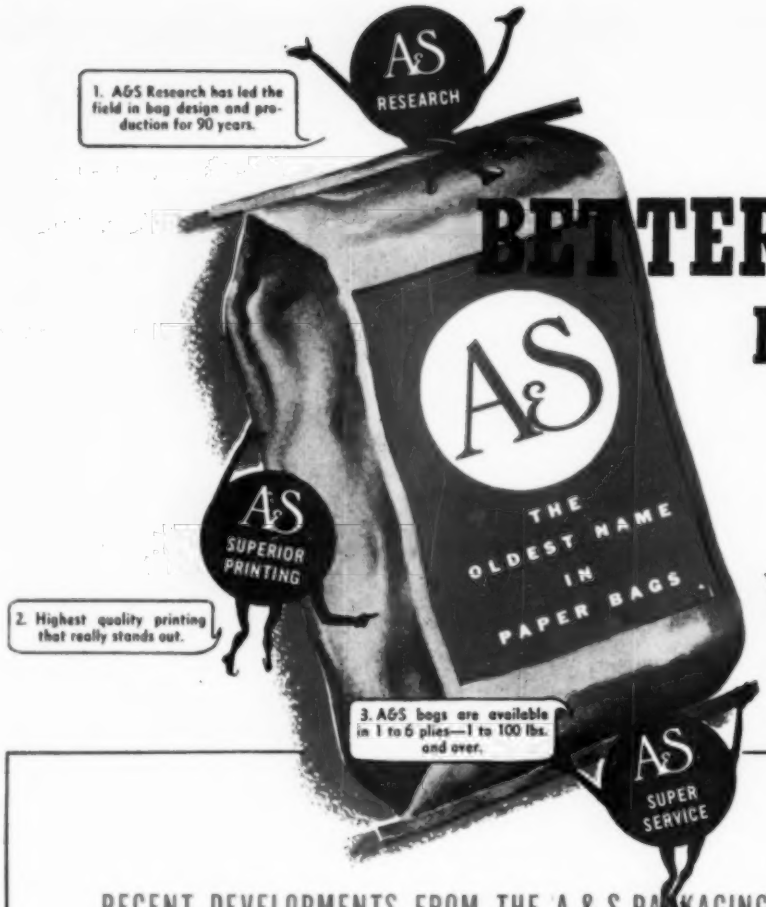
Wilson and Jackson (1946) noted that small particles, particularly those of colloidal size, inhibit the toxic value of rotenone dusts.

Density

MIXED dusts of varying densities, or bulking values, are in demand for hand, power, and airplane dusting operations. Light dusts, 30 to 35 lbs. per cubic foot, may be applied successfully by hand or by operators of ground machines who time their dusting carefully to periods when there is little or no wind (5 miles per hr. or less). Medium weight dusts, approximately 35 to 45 lbs. per cubic foot, are frequently preferred for ground power dusters, although free flowing dusts, weighing 45 lbs. per cubic foot, are handled efficiently by certain airplane operators. Free flowing finished dusts, weighing approximately 50 to 60 lbs. per cubic foot, are generally preferred by airplane operators, since the more weight per cubic foot the greater pay load they can carry per flight. There is a tendency for certain custom dusters operating ground duster equipment to dust in winds up to 10 to 12 miles per hour, and in this case, heavy dusts are the only kind that are at all effective. A light dust under these conditions will blow or drift away from the treated field and even far beyond it.

Janes and Wilson (1944) state that poor results were secured in pea aphid control with rotenone dusts when the dispersant material was too light. Large portions of the dusts drifted away from treated fields.

Moretti (1947) states that bulk density is closely related to particle size and is also a mass factor,



RECENT DEVELOPMENTS FROM THE A & S PACKAGING LABORATORY

Expendable Pallets — Palletized shipments of A&S bags lower your handling costs, minimize storage space.

STA-STAK Bag—Creped outer wall takes skid and slip out of stacking. Greater resiliency, easier handling.

SHUR-CLOSE—Ingenious bag valve assures less dust when packing—less sifting when packed —prevents waste.

PLASTO-PAK Bags—Polyethylene lined, moisture-proof protection for hygroscopic materials with exclusive "Electro-Seal" bottom closure.

SUPER GLOSS Flour Bag—Toughest of flour bags is bright white with brilliant inks to provide sparkling, appealing shelf packages.

ARK-TONE Printing—Sharp, clear color process combines perfect reproduction and brightness for consumer packages.

HI-TONE Printing—Strong, deep colors for sugar, salt, rice and similar bags.

PRESSUR-PAK Bale — Bags are packed under pressure. Saves 50% of customers' space allotted to storage.

ARKELL and SMITHS

CANAJOHARIE, N. Y. • WELLSBURG, W. VA. • MOBILE, ALA.

ARKELL & SMITHS 90 YEARS OF KNOW HOW THE OLDEST NAME IN PAPER BAGS

The flowability or fluidity of the finished dust may be controlled to some extent by variation in bulk density.

As already noted, Potts (1946) determined that weight or density of the diluent has a direct bearing on the distribution and deposit of a dust. Dust particles of heavy substances, such as barite, deposit somewhat better than do particles of light materials. However, from the standpoint of a deposit, the weight of the individual particles of a diluent material is not as important as the presence of agglomerates or dust groups in a dust cloud.

Fluidity

ONE of the most important characteristics of an agricultural diluent from the dust manufacturer's viewpoint is its fluidity or flowability. Diluents that will not mix with active ingredients to form a free flowing dust are generally doomed to failure.

The ability or property of the finished dust to flow freely and uniformly from the hopper may to a large extent determine its acceptance either by the airplane operator or the ground dust machine operator. Many dusts with high killing power do not give satisfactory results in the field because they do not feed easily and uniformly to the distributing apparatus of the duster or plane. As a result uniform spreading of the dust is impossible, and the control results secured are frequently checkered or unsatisfactory.

Fluidity or flowability of an agricultural diluent seems to be a character inherent within the type of diluent itself. It is especially associated with the tendency of the diluent to retain its individual particle size or to form agglomerates. Fluidity or flowability may be somewhat modified by the particle size and by varying the density of the finished dust. As a rule, the coarser the particle size, the greater the flowability. However, the flowability of a very fine particle size agricultural diluent, as well as of the finished dust, may often be greatly improved by the addition of small amounts of conditioning agents such as wood flour, rosin, tricalcium phosphate, superlight silicas, and certain other materials. Each diluent or combination dust presents its own individual problem that must be solved by the dust manufacturer if the finished dust mixture is to be used successfully in the field. Some diluents, as stated, such as certain talcs, have free flowing qualities and need no additional conditioners. Sometimes the agricultural diluent is free flowing but the active ingredients or oils added to the finished dust tend to reduce or nullify this free flowing quality. Research has a wide field for improving the fluidity or flowability of agricultural diluents and finished dusts.

Agricultural diluents with particles that tend to aggregate or form agglomerates (dust particle groups) as a rule have poor flowability even in the large particle state, (40 micron). Wilson et al (1944) noted a relationship between electrostatic particle charge, dust particle aggregates, and poor dispersion on the underleaf surface. Potts (1946) noted that dust aggregates or agglomerates do not stick well to plant foliage.

Moisture

IN no instance is the presence or absence of moisture in an agricultural diluent of more importance than in the manufacture of dusts with the organic insecticide, tetraethyl pyrophosphate. It is extremely important that the moisture content of these diluents be reduced through calcining to a minimum quantity, ("Frianite-HP 0.06% to 0.08% moisture);* dessicated gypsum (approximately 1-½ molecules H_2O of crystallization removed). In some cases, a small amount of diatomite is mixed with the gypsum before calcining. This improves the absorbing power of the diluent. It is also highly essential that the calcined material be properly packed in moisture-free drums or special moisture-proof polyethylene bags. The finished dusts must be delivered in similar containers unless used immediately.

* The manufacturers state this is a minus algebraic quantity; which accordingly depends upon the method of analysis.

After testing 61 agricultural diluents, Hunt (1947) noted that the toxicity of each mineral diluent and dust mixture was greater under conditions of high temperature and low humidity than under low temperature and high humidity. The relative importance of an agricultural diluent depends upon climatic conditions such as temperature and relative humidity. Campau and Wilson (1944) stated there seemed to be an *inverse* relationship between the amount of hygroscopic moisture absorbed by a diluent and its effectiveness as a dust.

Chiu (1939), testing six agricultural diluents, found the killing power of the "inerts" much more rapid at low relative humidities than at high relative humidities. When the relative humidity reached 70% or higher, the effectiveness of the dust was markedly decreased but the killing power was not entirely lost. Findings indicate that at least one of the factors contributing to the death of the insects was dessication. Chiu (1939) further states that the rate of loss of water from the treated insect was directly related to the degree of humidity. If the water loss goes beyond a certain critical point, the insect cannot survive. Insects can lose a large amount of fat and protein and yet live, while a loss of a small amount of water may result in death. Hunt (1947) states that the fatal limit of dessication varies for different species of insects. Consequently, they exhibit a variation in susceptibility to dessicating dusts. In general, the fatal limit, according to Germar (1936) is about 30% loss of the total water content of the insect body. Wilson and Janes (1942) state that *humidity* was more important than temperature in its effect on pea aphid control with rotenone dusts.

pH Value

THE pH reading or degree of acidity or alkalinity of an agricultural diluent is important in many cases. Alkaline diluents cause rapid deterioration and accordingly are not recommended for use with the new

(*Turn to Page 78*)

don't close your eyes...

the all around insecticide

Chlordane offers many advantages to the formulator and manufacturer of agricultural insecticides. It is quality controlled in production to insure uniformity and consistent high level performance. When used as a wettable powder, dry dust or water emulsion **chlordane** offers maximum control of insect pests.

Being an all around insecticide **chlordane** is versatile enough to control a variety of insect problems.

To the farmer, **chlordane** based insecticides provides assurance of a profitable, healthy crop.

So meet the increasing demand for **chlordane,** the all around insecticide, by ordering today.

For information concerning proper formulations and applications write to:

VELSICOL
CORPORATION

330 E. GRAND AVENUE, CHICAGO 11, ILLINOIS • REPRESENTATIVES IN PRINCIPAL CITIES

NFA Meeting

Features Symposium on the Question of High Analysis Fertilizer Manufacturing

THE annual fall meeting of the National Fertilizer Association was scheduled to be held at the Edgewater Gulf Hotel, Edgewater Park, Mississippi, November 13-15. This meeting, heretofore held in Atlanta, Ga., marks the first departure from the former location in many years and is in keeping with the broader scope of use of fertilizer materials, the Association points out.

Announced a few weeks ahead of the meeting, the advance program indicated that registration would begin on Monday, the 13th and that the remainder of the day would be devoted to meetings of the executive committee of the Association, and its board of directors.

A breakfast meeting of the Plant Food Research Committee was scheduled for 8 a.m. Tuesday. The regular session opens at 10 a.m. with J. E. Totman, Baltimore, Md., chairman of the NFA board of directors presiding. Mr. Totman was also scheduled to present the annual address of the board chairman at this session. An address by Norris E. Dodd, director general of the Food and Agricultural Organization of the United Nations was to follow Mr. Totman's talk. Subject of Mr. Dodd's address had not been announced at press time.

Scheduled also for Tuesday's program, was an address by Robert Lee Humber, Greenville, North Carolina attorney. That evening the annual NFA banquet was scheduled to be held, followed by a program of entertainment.

Mr. Totman was to preside at Wednesday's morning session, also. On this agenda was to be a panel discussion on the merits of low and high analysis fertilizers. Moderator of this symposium was to be Dr. J. F. Fudge, state chemist, College Station, Texas, with the following men appearing on the panel: Maurice J. Lockwood, vice-president, International Minerals & Chemicals Corp., Chicago, and former president of the National Fertilizer Association; A. F. Miller, general manager of Swift & Co. Plant Food Division, Chicago; Ivan E. Miles, extension agronomist, Mississippi State College, State College, Mississippi; and H. L. Dunton, head of the Agronomy Department at Virginia Polytechnic Institute, Blacksburg, Va.

The meeting was to adjourn following this session, the advance announcement stated.

The Association also announced that special fishing trips and other excursions along the Gulf Coast would be available to those attending the convention, and that such arrangements should be made directly with the hotel management.

A full report of the Edgewater NFA meeting will apear in the December issue of *Agricultural Chemicals*.

"Does the Organic Farming Cult have a case against Chemical Fertilizers?"

IN response to the article appearing in our October issue, *Agricultural Chemicals* has been receiving many letters from manufacturers and others in the fertilizer trade, commenting on the subject. We hope to present a subsequent article made up largely of excerpts from these letters and solicit your comments.

Undoubtedly there are areas of interest which our article did not touch. These should be filled in by readers who have information so that full testimony may be had.

Address your letter to Agricultural Chemicals, Editorial Dept., 254 West 31st Street, New York 1, N.Y.

Safeguard Fertilizers and Chemicals against RAIN SNOW SLEET SUN

. . . with Hammond Multi-Wall Bags. They are weather-proof . . . special moisture-proof plies are used for products requiring extra protection.

HAMMOND Betterbags

Representatives in the following cities:

Chicago, Ill. Minneapolis, Minn. New York, N. Y.
Bluefield, Va. Philadelphia, Pa. Columbus, Ohio
Charlotte, N. C. Ligonier, Pa. Houston, Texas
Kansas City, Mo. Opelika, Ala.

HAMMOND Multi-Wall BAGS

SEWN PASTED OPEN MOUTH VALVE STYLE

HAMMOND BAG & PAPER CO.

General Offices: Wellsburg, W. Va.

Plants in Wellsburg, W. Va. and Pine Bluff, Ark.

Phytopaths Gather at Memphis for 42nd Annual Convention

THE American Phytopathological Society will gather in Memphis, Tennessee, December 1-3 for its 42nd annual meeting. Hotel Peabody will be headquarters. Meeting in conjunction with the APS will be the Society's southern division and the Potato Association of America.

The convention will begin Friday morning, Dec. 1, with a business session at which APS president C. M. Tucker, Lexington, Ky., will preside. The Southern Division will hold its business session later that morning. The afternoon will be divided into sections A, B and C, covering the following respective topics: "A": Forage and Fiber Crop Diseases, J. L. Allison, leader; "B," Tomato Diseases, J. P. Fulton, leader; "C," Fungi, C. E. Cox leader.

Friday evening's session will be divided into three sections, also. Section "A," on Fungicides, will be led by W. D. McClellan. Presenting papers on this part of the program will be D. M. Yoder, Cornell University; G. T. Stessel, University of Minnesota; C. Leben and G. W. Keitt, University of Wisconsin; J. R. Vaughn and W. Klomparens, Michigan State College; Saul Rich, Connecticut Agri. Experiment Station; J. G. Horsfall, Conn. Agri. Exper. Station; D. J. deZeeuw and A. Anderson, Michigan State College and U.S.D.A.; and E. L. Felix, University of Tennessee.

Section "B," will be under the leadership of G. W. Keitt, discussing Stone Fruit Virus Diseases; while the remaining session, with E. E. Clayton as leader, will cover disease resistance.

Saturday, Dec. 2, will see a continuation of concurrent sessions. The first covering the physiology of fungi and parasitism, will have T. H. King as leader. Section "B," virus diseases, will have G. H. Berkeley as leader while the third section will discuss soybean and peanut diseases. E. M. Cralley is section leader. Concurrent sections will feature the Saturday afternoon sessions, also. Vegetable crop diseases will be discussed in one section under the leadership of Glen Pound; another section on virology will be led by A. F. Ross, and a third section, a symposium for extension workers will have J. O. Andes as chairman. The annual phytopath banquet will be held on Saturday evening.

Following the dinner, to be held at Convention Hall, three concurrent sessions will be held beginning at 8:30 p.m. These will include one section on the teaching of plant pathology with G. C. Kent as chairman; another discussing the question, "Should the survey revive crop loss estimates?" with Paul R. Miller as chairman; and the third, the fungicide colloquium, under the direction of Dwight Powell, University of Illinois, and Frank L. Howard, Kingston, R. I. The complete roster of speakers for the colloquium had not been announced at press time, but Dr. Howard said that speakers representing the Food and Drug Administration, the industry, and the science of plant pathology were expected to appear on the program. They were to develop the theme of fungicidal residues on plants. Dr. C. F. McNew, director of the Boyce Thompson Institute of Plant Research, Yonkers, N. Y., will talk on "The Present Status for Control of Diseases on Edible Fruits and Vegetables in the U. S.", and Dr. Powell will report on the National Cooperative Fungicide Tests for 1950.

Other speakers were expected to talk on aspects of plant disease and national defense, and the role of plant pathology in national defense. The possibility of a shortage of sulfur for fungicides is also to be covered, Dr. Howard said.

Representatives of industry were invited to present new fungicides at the colloquium, with five minutes allotted each speaker to describe his product. A special table for mimeographed or printed literature will be provided for those taking part in the colloquium. Dr. Howard said that any industry person desiring to appear on this part of the program, should get in touch with him soon as possible, at Kingston, R.I.

Sunday morning's session will begin at 9 o'clock with a business session in charge of C. M. Tucker. At 10:30, concurrent sessions will get under way discussing corn and sorghum diseases; forest pathology; and chemotherapy. The sections will be led by J. E. Livingston, J. C. Carter and A. E. Dimond, respectively.

Diseases in small grain crops will be discussed in the Sunday afternoon session due to start at 1:30. M. R. Rosen is leader of this section, while A. J. Braun and A. G. Plakidas are leaders of two other concurrent sections, fruit crop diseases and tobacco and special crops, respectively. A joint session with the Potato Association of America is also scheduled for Sunday afternoon. The meeting will end upon termination of the Sunday afternoon session.

Officers of the APS are: C. M. Tucker, president; J. G. Horsfall, director of the Connecticut Agricultural Experiment Station, New Haven, Conn., vice-president; and Curtis May, U. S. Department of Agriculture, Beltsville, Md., secretary-treasurer. The committee on local arrangements for the Memphis meeting are J. O. Andes, chairman, W. W. Hare, J. M. Epps, Coyt Wilson and F. J. Libeau.

ALLETHRIN

approved

FOR HOUSEHOLD and DAIRY SPRAYS

Check these advantages...

Mild Odor

Light Color

No Precipitate

Greater Stability

Ease of Handling

Low Toxicity to Warm-Blooded Animals

Lower Cost

Prompt Delivery

Allethrin is sold in technical grade or in formulations. Pyresyn 2% (allethrin) and Allexcel 20 (allethrin plus synergist) are our trade names for 20:1 concentrates with the above advantages.

May we send you complete details?

S. B. PENICK & COMPANY

50 CHURCH STREET, NEW YORK 7, N. Y.
Telephone, COrtlandt 7-1970

S. B. PENICK & COMPANY · ASHEVILLE · NEW YORK · CHICAGO

735 WEST DIVISION STREET, CHICAGO 10, ILL.
Telephone, MOHawk 5651

Eastern Branch, AAEE to Philadelphia Meeting

PROGRAM details for the meeting of the Eastern Branch of the American Association of Economic Entomologists were well under way as this issue went to press. The meeting is scheduled to be held at the Warwick Hotel, Philadelphia, November 20 and 21. According to the group's secretary, Dr. B. F. Driggers, Rutgers University, New Brunswick, N. J., titles of papers to be presented at the meeting included reports on tests conducted during the past season, progress reports on new insecticides and studies on the imparting of off-flavors to fruits and vegetables through insecticides.

Some of the titles are as follows: "Field Experiments for Control of the Oriental Fruit Moth," by M. L. Bobb, Charlottesville, Va., being a report of insecticide tests on the pest in 1949 and 1950, including data on the correct timing of sprays. "Evaluation of Some New Insecticides for Apple Maggot Control," by R. W. Dean, Poughkeepsie, N. Y. This paper states that the toxicity of a number of chlorinated hydrocarbon and organic phosphate insecticides were tested in the laboratory, and some of the more promising ones were tried under orchard conditions.

"Control of the Two-Spotted Spider Mite on Strawberries," by R. N. Hofmaster and D. E. Greenwood, Norfolk, Va. This paper will relate details of good control through application of an herbicide. The question of whether the Elm Scolytus is becoming resistant to chlorinated insecticides will be discussed by Stanley W. Bromley, Stamford, Conn. His paper presents evidence to indicate that this is true.

T. W. Kerr, Jr., Kingston, R. I., will present a paper on the chemotherapeutic value of several insecticides for larvae of certain leaf-mining insects. This will be a report of field experiments in 1949 and 1950.

"Activated Carbon to Counteract the Effect of Benzene Hexachloride on Flavor of Potatoes" is the title for a paper to be delivered by Neely Turner of the Connecticut Agricultural Experiment Station, New Haven. He will tell of small plot and field experiments with 10, 50 and 100 pounds of activated carbon per acre.

"The Importance of the Time of Application of DDT Sprays in the Control of European Corn Borer" will be discussed by John H. Hawkins, University of Maine, Orono. This paper discusses the results obtained from application of sprays at the different levels of borer hatch and coincident growth stages of sweet corn plants.

"Effects of DDT Spray residues on Larvae of the Tick *Dermacentor variabilis*," will be presented by D. L. Collins and R. V. Nardy, Albany, N. Y. Their paper points out that field tests indicate DDT sprays applied to control adult ticks on grass may also have an effect on the larvae through residual action.

Chairman of the Eastern Branch group is Edwin Gould, West Va. Experiment Station, Kerneysville, W. Va., and F. H. Lathrop, Maine Agricultural Experiment Station, Orono, Me., is vice-chairman for 1950. Dr. Driggers has been secretary of the Eastern Branch for a number of years.

AAEE & ESA to Denver in December

MEETING with the Entomological Society of America, the American Association of Economic Entomologists will hold its annual convention at Denver, Colorado, December 18-21. Headquarters for the A.A.E.E. will be the Cosmopolitan Hotel, and the ESA will make its headquarters at the Shirley-Savoy.

From the organization standpoint, this meeting promises to be one of special interest, according to Ernest N. Cory, College Park, Md., secretary of the A.A.E.E. Separate committees of the two organizations, appointed to study the question of consolidation of the two groups, have been combined into a joint committee to make further study and to present recommendations at the Denver meeting. This report will be considered by the separate executive committees, and it is expected that a letter ballot on consolidation will be taken sometime in 1951.

The December program was shaping up at press time, Dr. Cory reported. The program committee is composed of L. D. Christenson, chairman, and Floyd Andre and H. G. Johnston. The committee in Denver, in charge of local arrangements, consists of Dr. George M. List, Claude Wakeland, James Dutton, W. E. McCauley and B. Thomas Snipes.

Members of the two associations were to make their own arrangements with the hotels where the meetings will be held.

The Listening Post

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Dr. Haeussler is in charge of Insect Pest Survey and Information, Agric. Research Adm., B. E. & P. Q., U.S.D.A. His observations are based on latest reports from collaborators in the department's country-wide pest surveys.

By G. J. Haeussler

Vegetable Insects

INFESTATIONS of the Mexican bean beetle continued in moderate abundance from New York southward along the Atlantic Coast to northwestern Florida thence westward to Mississippi, and in Tennessee and Ohio, until the end of September when populations declined generally. The insect remained rather abundant, however, in localized areas in Virginia, Georgia, and northwestern Florida until the middle of October. The corn earworm was moderately abundant in snap beans in eastern Virginia, eastern South Carolina, Georgia, and Florida and in lima beans in central Washington and southern California late in September and early in October. It was reported as very abundant and destructive to young peas and lettuce in the Lower Rio Grande Valley of Texas by the middle of October. The bean leaf roller was abundant on beans in the Everglades district of Florida and was occurring in moderate numbers on beans in southern Georgia and eastern South Carolina during the period covered by this report. The lima bean pod borer was injuring lima beans in southern California the first week of October. Snap beans in the Lower Rio Grande Valley of Texas and in the Everglades district of Florida were damaged by the lesser cornstalk borer and that insect was reported from snap beans and cowpeas in Alabama and Mississippi.

The common caterpillars of cabbage and related crops were reported in the usual abundance throughout the country during the last half of September and first half of October. The vegetable weevil was attacking turnips in central Georgia the first week in October.

The potato aphid was moderately abundant on potatoes in eastern Virginia and central Washington and destructively abundant on tomato in southern California. The green peach aphid was very abundant on potato in central Washington. The potato psyllid was abundant on late potatoes and tomatoes in Colorado, Nebraska, and Wyoming the middle of October. Moderate infestations of the tomato fruitworm in late tomatoes were reported from eastern Virginia, Alabama, and Mississippi during September and this insect was destructively abundant on tomato in southern California toward the middle of October. Hornworms were injuring tomatoes in the lower Rio Grande Valley of Texas the last week of September.

Cotton Insects

THE boll weevil continued to be very abundant in all of the areas where it occurs. The cotton leafworm continued abundant and probably defoliated more cotton during September than during any September in recent years, at least since 1943. It reached abundant numbers before the crop matured in many cotton fields in northern Texas, Oklahoma, Arkansas, and Missouri, causing serious losses in yield and quality. Spread of the moths was reported to have reached various points in Mississippi, Alabama, and South Carolina. The pink bollworm situation in Texas seems to be more serious than during recent years. Reports indicate that the insect has reached a number of counties in southern Texas where it had not been reported in recent years.

New Screwworm Remedy

THE screwworm, the most destructive livestock pest in southern states, was widespread this summer and fall, although infestations were not very heavy. Surveys during September showed that the insect had spread to several counties in California as far north as Sonoma and Yolo counties, throughout Arizona, and southern and eastern New Mexico. Surveys in the Great Plains and the central and southeastern states showed light scattered infestations as far north as Kansas, Iowa, Illinois, Indiana, Kentucky, and Virginia.

On October 23, the U. S. Department of Agriculture announced a new remedy for the control of the screwworm. The new treatment, to be known as "EQ 335" screwworm remedy, contains lindane. The formula requires by weight 3 parts of lindane, 35 parts of pine oil, 42 of white mineral oil, 10 of an emulsifier, and 10 of a silica gel. It is applied to wounds with a small paint brush. The treatment kills maggots deep in the wounds, young maggots as they hatch from eggs, and flies attracted to the wound to feed or lay more eggs. The killing of flies attracted to wounds is an attribute new to Department screwworm remedies. This will help reduce the number of animals attacked by the flies.

The development is being announced at this time so that those interested in manufacturing the new remedy can arrange to have supplies available for use by stockmen before the screwworm control season starts next spring.

The new remedy is the result of four years of laboratory and field tests carried on by the Kerrville, Texas laboratory of the Bureau of Entomology of Plant Quarantine. Department veterinarians with the Bureau of Animal Industry participated in the development by studying the effects on livestock of the materials contained in the remedy. They found this formula did not affect the health of animals when treated according to directions.

THOMPSON-HAYWARD

FARM-TESTED CHEMICALS

PHENACIDE
(TOXAPHENE)
TOXICHLOR
(CHLORDANE)
DED-WEED
(2,4-D)
DED-TOX
(DDT)
TRI-6
(BHC)

These are only a few of the agricultural chemicals Thompson-Hayward produces. Whatever your needs, you will always find a dependable Thompson-Hayward product for that particular purpose available through your nearby Thompson-Hayward warehouse. You can be sure, too, that every Thompson-Hayward product is scientifically formulated under strict laboratory controls to assure maximum results for the user and help build repeat business for Thompson-Hayward dealers.

THOMPSON-HAYWARD CHEMICAL COMPANY

AGRICULTURAL DIVISION KANSAS CITY, MISSOURI

MINNEAPOLIS • OKLAHOMA CITY • N. LITTLE ROCK • SAN ANTONIO • DES MOINES • DAVENPORT • NEW ORLEANS
ST. LOUIS • HOUSTON • DALLAS • WICHITA • MEMPHIS • CHICAGO • OMAHA • DENVER • TULSA

Tests with the new remedy have been made on thousands of animals during the past four years. No animal has been injured in all these tests, but the entomologists point out that young animals, especially calves, might be sickened if the treatment is not applied properly. They recommend that only the wound and a narrow strip of an inch or less about the wound be treated.

Screwworm remedy "EQ 335" is said to be superior in several ways to "EQ 62" the Department's screwworm remedy that has been widely used to control screwworms for a number of years. It will not deterioriate upon standing. Tests have shown that one application of "EQ 335" usually lasts for seven days, while two treatments of "EQ 62" are required to protect wounds for the same period of time. Wounds treated with the new remedy heal quickly. Lamp black and other coloring chemicals that stain clothing, wool, or hair have been omitted from the new formula.

The entomologists caution

(*Turn to Page* 82)

Fungicide Test Results Made Known

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

R. W. LEUKEL of the U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering has summarized the results of the 1950 tests with various fungicides for seed treatment of oats and barley. Plantings were made at St. Paul, Minnesota, Fargo, North Dakota, and Pullman, Washington, with the cooperation of workers at these stations, in addition to the tests at Beltsville, Maryland.

The following materials were tested with regard to their effect on germination and their effectiveness in controlling the loose and covered smuts (*Ustilago* spp.) of oats and the stripe disease (*Helminthosporium gramineum*) of barley:

"Ceresan M"—7.7 percent ethyl mercury p-toluene sulfonanilide applied both as dust and a slurry.

"Aagrano 48"—1.8 percent ethoxy propyl mercury bromide.

"Aagrano 250"—3.6 percent ethoxyl propyl mercury bromide.

"Semenon"—8 percent isopropyl methyl mercuric acetate. (This was thought to be a 2-percent product and hence the seed was overtreated).

"New Improved Ceresan"—5 percent ethyl mercury phosphate.

"Mercuran A.S."—3.5 mercury in the form of methoxy ethyl mercuric acetate applied as a dust.

"Mercuran A.L."—7 percent mercury in the form of methoxy methyl mercuric acetate in soluble form and to be applied by the "quick wet method."

"Parson's Seed Saver Dust"—a complex quaternary ammonium compound containing 3.8 percent mercury.

"Panogen"—2.1 percent methyl mercury dicyan diamide, a liquid to be applied by the "quick wet" method.

Two plantings were made at Beltsville and one at each of the other stations. Sufficient oat smut developed in the check rows at all the stations to furnish a fairly adequate test for the fungicides in the control of this disease. These data are presented in Table 1. Only at Beltsville, however, were there enough stripe-infected barley plants in the check rows to furnish significant results on the control of stripe-disease. These data are presented in Table 2.

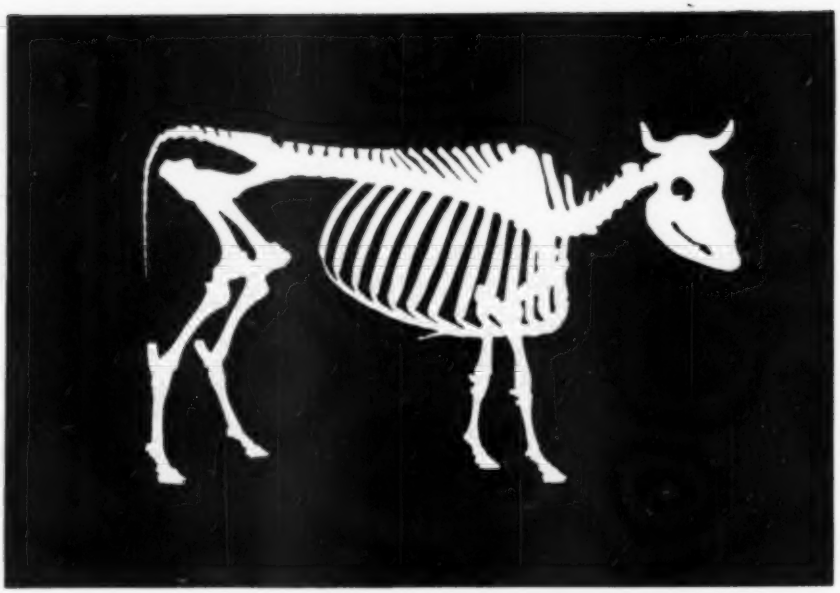
Emergence was not adversely affected by any of the fungicides except "Semenon," which, because of insufficient labeling regarding its concentration, was applied at four times the intended dosage. Storage of the treated seed lots at room temperature for six months did not impair their viability.

The "Ceresan" dusts, which were used as standards of comparison, eliminated both the oat smuts and stripe disease. The "Aagrano" treatments, "Semenon," and the two heavier applications of "Panogen" were equally effective. "Ceresan M" slurry did not eliminate oat smut completely, probably because of the shortcomings of applying a slurry treatment on a small scale. "Mercuran A.S." (dust) eliminated oat smut and all but a trace of stripe disease. "Mercuran A.L." was less effective in oat smut control. "Parson's Seed Saver" was relatively ineffective. The fact that "Panogen," applied at ¾ ounce per bushel, failed to eliminate oat smut and barley stripe completely, seems to confirm the writer's previous minimum recommended rate of one fluid ounce per bushel for this fungicide.

Fungicidal Sprays

ACCORDING to Warren N. Stoner, of the Florida Agricultural Experiment Station, sweet corn has become increasingly important as a winter and spring vegetable crop in Florida; but so has its growing on a large scale been attended by an increasing number of problems. Leaf stripe, or leaf blight, caused by the fungus *Helminthosporium turcicum*, has become a serious danger, even perhaps a limiting factor, to the continued production of the crop. Because of this threat, fungicide trials were started at the Everglades Experiment Station during the 1949-1950 season.

The disease can be found in the area throughout the year. Comparatively frequent rain, high humidity, and nightly heavy dews experienced locally favor its development. These climatic factors impose some restrictions on field trials. Observation had indicated that sprays generally are more effective in the area than dusts;



AMMONIA NITROGEN puts on the MEAT

Ammonia nitrogen, fed to pasture land, puts on the meat, fattens the harvest of T-bones. For dairies it means more well-fed cows per acre, and higher milk production. And better-fed work stock, and hogs. Ammonia nitrogen increases the protein content as well as the yield of grain and grass crops.

High-nitrogen fertilizer applied in the Fall gives the rapid start necessary to building a year-round pasture program.

CSC produces anhydrous ammonia, the most concentrated and economical commercial source of nitrogen, at its Sterlington, Louisiana plant. The major part of this production is going to Gulf Coast manufacturers for conversion into high-nitrogen fertilizers.

PRODUCTS OF THE AGRICULTURAL DIVISION
Anhydrous Ammonia • Benzene Hexachloride
Choline Chloride • Condensed Distillers' Molasses Solubles • Dilan • Ethyl Formate
Metaldehyde • Niacin • Butyl Fermentation Solubles and Riboflavin Feed Ingredients

CSC
COMMERCIAL SOLVENTS CORPORATION

17 East 42nd Street, New York 17, N. Y.

Table 1

Percent emergence from treated oat seed (Canadian variety) at 18° C. after storage periods of 1 and 6 months at room temperature; and percent of smutted plants grown from this seed in field plots at four stations in 1950.

No.	Seed treatment: Fungicide	Ounces per bu.	Percent emergence after storage for: 1 month	6 months	Percent infection in plots planted at: Beltsville, Md. March 30	Beltsville, Md. April 11	Fargo N. Dak.	St. Paul Minn.	Pullman Wash.
1	Ceresan M	0.5	98	99	0	0	0	0	0
2	Aagrano 48	1.0	99	95	0	0	0	0	0
3	do	2.0	98	90	0	0	0	0	0
4	Aagrano 250	0.5	98	95	0	0	0	0	0
5	do	1.0	97	90	0	0	0	0	0
6	do	1.5	95	88	0	0	0	0	0
7	Semenon,	2.0	88	85	0	0	0	0	0
8	do	3.0	67	80	0	0	0	0	0
9	N. I. Ceresan	0.5	98	94	0	0	0	0	0
10	Untreated	—	98	90	12.8	22.9	13.6	44.7	14.7
11	Mercuran A.S.	0.5	97	95	0	0	0	0	0
12	do	1.0	96	94	0	0	0	0	0
13	Parson's Seed Saver	1.0	96	90	11.7	19.7	9.9	22.0	10
14	Mercuran A.L.[b]	0.25	97	90	.1	.5	1.7	.7	1.3
15	do[b]	0.5	93	88	.5	.9	1.7	1.7	2
16	Ceresan M slurry	0.5	94	99	.5	.2	0	1.0	0
17	Panogen[b]	0.75	97	95	1.1	.4	1.1	2.3	0
18	do[b]	1.00	97	96	0	0	0	0	0
19	do[b]	1.25	97	96	0	0	0	0	0
20	Untreated	—	98	90	13.2	23.1	15.7	40.3	11.4

[a]This 8 percent product was not labeled as such and hence seed was overtreated.
[b]Applied in liquid form by the "quick wet method."

Table 2

Percent emergence from treated seed of Atlas barley at 18° C., after storage for 1 and 6 months at room temperature; and the percentage of stripe-disease in plants grown from this seed in field plots at Beltsville, Maryland, 1950.

No.	Seed treatment: Fungicide	Ounces per bu.	Percent emergence after storage for: 1 month	6 months	Percent striped plants from seed sown: March 30	April 11
1	Ceresan M	0.5	96	98	0	0
2	Aagrano 48	1.5	96	96	0	0
3	Aagrano 250	.75	95	97	0	0
4	Semeon[a]	2.5	75	95	0	0
5	N. I. Ceresan	0.5	97	99	0	0
6	Mercuran A. S.	.75	98	96	0.3	0
7	Untreated	—	98	93	30.0	20.0
8	Parson's Seed Saver	1.0	96	94	14.0	3.5
9	Mercuran A.L.[b]	0.5	96	95	0.3	0
10	Ceresan M Slurry	0.5	92	97	0	0
11	Panogen[b]	.75	95	99	0.1	0
12	do[b]	1.0	93	95	0	0
13	do[b]	1.25	93	95	0	0
14	Untreated	—	98	97	32.0	22.0

[a]This was an 8-percent product but was not labeled as such, hence the dosage was four times as great as intended.
[b]Applied in liquid form by the "quick wet method."

consequently spray application was used in the investigations. A relatively short spray interval was used so that new growth could be protected as soon as possible, and the schedule was varied to replace materials washed off by rains. The experiment was conducted late in the spring and early summer of 1950, in plots replicated 6 times on mature peat land. Standard disc nozzles were used and the materials were applied with trident headed hand wand using 250-300 pounds pressure. A sufficient amount of spray was used to obtain good coverage. The materials were not applied until the disease was apparent on the lower leaves of the plants. At this time the plants were 18 inches tall. An application was made every 3 days, if field conditions permitted, except that an extra spray was applied within 24 hours after each rain. The 3-day schedule was then resumed. Spraying was discontinued when the plants has tasseled.

(*Turn to Page 79*)

Suppliers' Bulletins

Mixing Equipment Bulletins

A. E. Poulsen & Co. have prepared folders describing their line of mixing and blending equipment. The company features a dual model for basic insecticide manufacturers who need extra capacity and desire to formulate concentrated dusts from technical grade toxicants. This model has dual elevators, two mixers with fine grinder between and sack-off, all in one unit.

The other model, designed as the "Standard," handles pre-mixed concentrates with four or more batches per hour with one man operating the unit. Literature on both blenders is available from the company. Address A. E. Poulsen & Co., Dept. 2, 2025 San Fernando Rd., Los Angeles 65, Calif.

•

Monsanto Bulletin Issued

New technical bulletin No. P-142 is offered by Monsanto Chemical Co., describing its complete line of emulsifiers and wetting agents. Also available is literature on the company's line of herbicides including 2,4-D and 2,4,5-T and its complete line of insecticidal chemicals. Address Monsanto Chemical Co., Organic Chemicals Div., 1766-J South Second St., St. Louis, Mo.

•

Offers Product Literature

Chemical Corporation of Colorado, Denver, has prepared bulletins on its line of insecticides and weed killers, all sold under the trade name of "Colorado .44." The products include toxaphene, chlordane, aldrin and DDT as well as 2,4-D and 2,4,5-T. Address the company at 1600 W. 12th Ave., Denver 4, Colo.

•

Toxaphene Literature

Hercules Powder Co., Wilmington, Del., has issued bulletins giving detailed information summarizing current federal or state recommendations for the control of agricultural insect pests related to the use of its product, toxaphene. Write for toxaphene information, Hercules Powder Co., 970 Market St., Wilmington 99, Delaware.

•

Offers New Paper Covering

Chase Bag Co., Chicago, has introduced a protective paper covering for barrels and drums used in chemical manufacturing plants. The covers, made of neoprene-impregnated creped Kraft, are made by combining neoprene latex with paper pulp at the mill, enabling the treated paper to resist sunlight, oils and chemicals. The makers say that the covers are quickly put on and taken off barrels, being held like a household bowl cover with elastic band at the edge. Literature is available from the company, 309 W. Jackson Blvd., Chicago 6, Ill.

•

Dust Collector Described

Prater Pulverizer Co., Chicago, has announced the development of its new "Pemasco Dust Master Collector," designed for the recovery of industrial dust which cannot be suppressed by conventional type of dry or wet centrifugal collectors.

According to the makers, the new system is a combination of features of the impingement collector, the spray tower and the packed tower. The device consists of four essential parts: a steel shell, spray assembly, a series of throat plates and one or more beds of ceramic packing.

•

Ag. Chemicals Bulletin

Kolker Chemical Works, Inc., Newark, N. J., has issued a new folder on its insecticide and weed killer products. The folder, printed in color, describes the DDT formulations used with both wettable powder and dust base materials; and the Kolker BHC formulations.

The folder, "Kolker Agricultural Chemicals," is available from the company, 80 Lister Ave., Newark 5, N. J.

•

Seed Treatments Offered

Chipman Chemical Co., Bound Brook, N. J., is introducing two new seed protectants. They are "Mergamma," a combination wireworm killer and seed disinfectant, and "Agrox," a mercurial seed disinfectant.

"Mergamma" contains 40% gamma isomer of BHC and 3.35% phenyl mercury urea (equivalent to 2% metallic mercury) to be applied either dry or as a slurry. The combination is said to control both wireworms and false wireworms and at the same time protecting against seed decay in the soil and certain seed-bourne diseases. Among these are bunt of wheat, smut of oats, and covered smut of barley.

A new product in the U. S., "Mergamma" was developed in Great Britain in the laboratories of Imperial Chemical Industries, Ltd. After exhaustive tests with the material for control of wireworm in both England and Canada as well as other countries, it was found that the refined BHC could be applied to the seed like ordinary seed treatments with good control and no damage to the seed when proper proportions were used. Organo-Mercurials were then incorporated for disease control, to make the dual-purpose product.

The product "Agrox," a mercurial seed disinfectant containing 6.70% phenyl mercury urea (equivalent to 4% metallic mercury), is for use where wireworms are not a problem. It, too, may be used either dry or as a slurry. Diseases controlled by "Agrox" include bunt or covered smut of wheat, covered smut and leaf stripe of barley and covered and loose smut of oats, kernel smut of sorghum and other seedling blights and seed rot organisms in the soil.

The manufacturers have published a folder describing the two products, with full instructions for use and amounts to use for best results on various crops. Bulletin is available from Chipman Chemical Co., Bound Brook, N. J.

FARM PORTRAIT NO. 11

Both getting off to a good start . . .

Reg. U. S. Pat. Off.
HIGRADE MURIATE OF POTASH
62/63% K_2O
GRANULAR MURIATE OF POTASH
50% K_2O MIN.
MANURE SALTS 20% K_2O MIN.

Any farm boy is, indeed, fortunate if he turns his attention early to those fundamental things upon which a successful farm life rests.

It may be some years before *this* particular young gentleman realizes it, but among such fundamentals must be included a realization of the importance of the wise use of suitable fertilizers. Many of these are compounded with potash—often with Sunshine State Potash, a product of New Mexico, and an outstanding soil nutrient that protects crops against plant diseases and droughts, and provides greater soil fertility.

UNITED STATES POTASH COMPANY, *Incorporated*, 30 Rockefeller Plaza, New York 20, N. Y.

Technical Briefs

Fertilizing Tobacco

Massachusetts agricultural experiment station investigators at Amherst, Mass., have been studying the effect of fertilizing tobacco seed beds in the fall and spring, and have concluded, according to the station's 1949 report, that "it definitely pays to sterilize and fertilize them in the fall."

At the same time, Wisconsin station scientists, in seeking the "best" way to fertilize tobacco, have concluded that there is no "best" way, since the "best" placement and rate "seem to depend on two things—the weather and the particular soil." Details of these two studies are included in the respective latest reports of the two stations.

•

2,4-D on Kidney Beans

Studies of 2,4-D in respect to the carbohydrate level of red kidney bean seedlings brought about the following observations:

1. The carbohydrate content of plants held in the dark for 36 hours was reduced to the point that 2,4-D applied to intact leaves was ineffective.

2. Mixtures of sugars, particularly sucrose, and 2,4-D were lethal when applied to a starved plant.

3. Starved plants were killed when 2,4-D was applied through the cut end of a petiole, or when it was applied through a sliver of the hypocotyl. Plants growing in normal day and night and treated through the hypocotyl seemed to resist death and grew abnormally.

4. Absence of toxic symptoms when shaded plants were treated, as reported previously, was probably due to failure of absorption and /or translocation. Instances in which shaded plants were killed more rapidly indicate that the physiological condition of the plant was such that 2,4-D was absorbed and translocated, and because of low carbohydrates it was therefore extremely toxic.

5. Respiration was stimulated by treatment of starved plants. The degree of stimulation appears to be correlated somewhat with the length of starvation before treatment.

6. When starved plants were treated through the hypocotyl the manner of death suggests that 2,4-D is strongly toxic to the protoplasm. Semi-permeability appeared to be destroyed, which caused exudation of the cell sap and eventual collapse of the tissue.

—Glenn E. Davis and Ora Smith, in *Cornell University Experiment Station Memoir* 293, 1950.

•

Weed Tests in Idaho

Idaho Experiment Station, Moscow, Idaho, continued work started in 1945, which has previously indicated that with non-selective spraying of field bindweed, the kill was practically the same regardless of whether 10 gallons or 600 gallons of water were used per acre. In the more recent tests, rates varying from 5 to 80 gallons of water per acre were used in the selective spraying of winter wheat infested with corn crowfoot. Kill was found about the same regardless of gallonage of solution used.

However, according to a progress report in the Idaho station's review of 1949 activities, the grain seemed to be more severely stunted when smaller amounts of water were used in the spray solution. This raised the question as to whether selectivity was being lost by very low gallonage. Tests were conducted to settle this on wheat, oats, flax and peas, both with and without annual weeds present. Rates used were 2½, 5, 10, 20, 40 and 80 gallons total solution per acre.

•

Application Experiments

As a result of experimental work for the past two years at Cornell University, the school's department of agricultural engineering has developed an applicator for concentrated insecticidal and fungicidal sprays. After having experienced difficulty with the material's "spilling out" of the spray a few feet from the outlet, the engineers this summer placed in the discharge pipe a short sleeve one or two inches smaller than the discharge pipe and four inches long. It was located so it prevented the nozzle discharge from reaching the inside of the discharge pipe, thus allowing the spray material caught by the sleeve to be picked up and atomized by the high velocity air stream. The advantage gained, according to Dr. C. W. Terry, professor of agricultural engineering, is that of stopping the motion of the droplets across the air stream before they leave the discharge pipe.

Cooperating with Dr. Terry in the development of the apparatus, were Dr. K. G. Parker and R. E. Adams of the department of plant pathology who did experimental work in the field.

•

Elm Disease Control?

Investigation of Dutch elm disease at the Rhode Island experiment station, Kingston, R. I., has resulted in development of a chemical combination which has given 50 percent or better control of the disease, according to the station's report of 1949 activities. Materials in the compound include certain derivatives of urea, salicylates and an azo dye, plus a basic material, the report states. Over 400 different compounds were evaluated to determine what effect they had in stopping damage done by the fungus. About 15 compounds showed promise and testing of these has been continued in field plots and on trees in private estates.

Regarding the combination found best to date, the report says it has produced about 70 percent control on experimental plots and about 50 percent on estate trees. It worked best when applied hydraulically to the sod and sub surface. Some early treatments were still effective after two seasons. Investigators determined that the chemical works in three ways. In addition to combatting the poison given off by the fun-

gus, it alkalyzes the soil and stimulates tree vigor. The work done is considered only a start in the right direction and the search will be continued to find a chemical combination that will give complete control of the disease, says the report. Assisting A. W. Feldman and F. L. Howard of the station staff was Nestor Caroselli of Bartlett Tree Research Laboratories.

•

BHC for Poultry Delousing

G. L. F. Exchange, Ithaca, N. Y., is recommending benzene hexachloride for delousing poultry flocks. The compound, it is explained, is brushed onto roosts late in the afternoon. When the chicken sits there that night its body heat speeds evaporation and the fumes penetrate through the feathers to kill the lice. Members of the co-op have been informed that this new use for BHC has been found both safe and effective by experiment station investigators at Cornell and in other states.

•

More Fertilizer on Berries

Strawberry growers in central Arkansas are reported to have changed their schedule for the application of fertilizers, according to reports from the State. Many growers are now applying from 200 to 300 pounds of 5-10-5 or 4-12-4 fertilizer to each acre in September, anticipating a stimulation of growth of runners and new plants in the autumn months. Many growers are now making their final application of fertilizer in November rather than in February as was formerly practiced. In this way, the plant food content of the fertilizer has a longer period to become available for use before the fruiting season.

Another favorable factor, it is pointed out, lies in the fact that no acid is left on the soil surface to damage the under side of berries during wet weather. Final date for the application of fertilizer before the bearing season, is February 10. If applied later than this, the plant food is largely unavailable for the current crop yield. It is indicated that both acreages and yields are being increased in the commercial strawberry-growing area of central Arkansas.

Reports Fungicides Safe

Tests conducted at South Carolina State Experiment Station, Clemson, S. C., have established that fungicides used for treatment of cottonseeds can be ingested by cattle in relatively large amounts over long periods without evident harm. Conditions of the cattle feeding tests and procedures used are outlined in the station's 61st annual report, and data are summarized as follows:

"Consequently the feeding of cattle with cottonseed treated with these chemicals (zinc salt and acetate ester of 2, 4-5 trichlorophenol) or as meal derived from such seed, should apparently not preclude the utilization of their tissues as human foods."

In other experiments at Clemson to determine the effect of various organic insecticides on the flavor of peaches, it was shown that benzene hexachloride did impart an off flavor to peaches, but that parathion and chlordane did not. The off flavor of BHC was more noticeable on canned peaches than on frozen or fresh fruit and it was indicated that it is not safe to use BHC later than the shuck-off stage. Residue analysis of peaches sprayed with parathion showed very little of the chemical present in the peel and none in the canned fruit, where six applications had been made of a spray containing 2 lbs., of 25 percent wettable parathion powder per 100 gals., water. The last application was made seven weeks before harvest. Parathion, it was concluded, would probably present no residue hazard, if only four or five applications (considered adequate for curculio control) were used, with the last application about four weeks before harvest.

•

Corn Borer Control

A small scale field method of evaluating insecticides for control of the European corn borer has been developed and used in which corn plants were hand infested by near-hatching egg masses. The technique has considerable possibilities in studies of timing of the borer infestation and application of an insecticide. In addition the evaluation of the effectiveness of an insecticide at high and low level populations of insects is possible as well as studies involving predator relationships. Experimental design is also quite flexible with this method. In general, evaluation of borer damage can be made in more detail than in most field experiments.

Studies made during the past growing season included the use of sprays applied in two different tests before and after placement of egg masses on plants. Results are given of a comparison of the efficiency of wettable powder and emulsion formulations of five insecticides. Comparisons of the toxicity of several other insecticides are included. In general, most of the emulsions showed a greater efficiency than the wettables at the time of initial kill but not in their residual effect. Exceptions were the 75 and 90 per cent wettable powders of DDT which were more effective in both studies. As regards residual action, the wettable powder sprays were, in general, more efficient than were the emulsions under the conditions of no rainfall prevailing during the experiments. The forms of parathion and TDE did not differ appreciably in effectiveness in the residual study.

Results obtained also indicate that a highly toxic material which deteriorates rapidly when sprayed, such as tetraethyl pyrophosphate, may serve as a useful tool in ceratain types of study. By its use populations of insects undesirable for the study may be reduced or nearly eliminated 24 or 48 hours prior to the introduction of an artificial infestation. Experimental work with the artifically infested plants may then proceed free from the competition or destruction caused by other forms.

Summary of article "Small Scale Field Evaluation of Insecticides for Corn Borer Control" by L. K. Cutkomp and F. G. Holdaway, University of Minnesota, St. Paul, in *J. of Economic Entomology*, August, 1950.

•

USDA Accepts Allethrin

Formulas containing allethrin have been accepted for use in gas-propelled aerosols, according to an announcement issued October 25 by S.

(*Turn to Page 69*)

INDUSTRY NEWS

California Fertilizer Association Meets

THE 27th annual meeting of the California Fertilizer Association was to be held at the del Coronado

JAMES M. QUINN

Hotel, San Diego, November 2-4, with a full program of discussions covering research, fertilizer supplies, reports of plant food experiments on citrus and other crops, new application equipment, fertilizers in irrigation water, and future prospects in the industry.

Speakers listed on the advance program included C. F. A. president James M. Quinn, California Sun Fertilizer Co., Los Angeles; Mayor E. G. Stanley, San Diego; Dr. Vincent Sauchelli, Davison Chemical Co., Baltimore, Md., Allen B. Lemmon, Chief, Bureau of Chemistry of California, Sacramento; DeWitt Bishop, fertilizer inspector, Sacramento; Dr. W. E. Domingo, director of agronomy, Baker Castor Oil Co.; Dr. Russell Coleman, president of the National Fertilizer Association, Washington, D. C.; M. E. McCollam, American Potash Institute; Dr. Daniel G. Aldrich, Citrus Experiment Station; J. H. Nelson, Nelson Laboratories, Stockton, Calif.; Dr. Hans Jenny, University of Calif., Berkeley; A. H. Dill, A. B. Farquhar Co.; and Dr. O. A. Lorenz, University of Calif., Davis.

The fertilizer supply situation was to be discussed by a panel composed of Wilson Meyer, Wilson & Geo. Meyer Co., San Francisco; David B. Scott, American Potash & Chemical Co., Los Angeles; Rene Jones, Anaconda Copper Co., Anaconda, Mont.; and F. H. Leavitt, Shell Chemical Corp., San Francisco.

In charge of the program committee for the convention was Wallace Macfarlane, Pacific Guano Co., Los Angeles. With him on the committee were T. Walter Houser, Southern California Fertilizer Co., Los Angeles; Jack Welch; Charles Carlson, Balfour, Guthrie & Co., Ltd., Los Angeles; P. E. Waugh, Riverside Fertilizer Works, Riverside, Calif.; and Elmer S. Nelson, executive secretary of the Calif. Fertilizer Association, Los Angeles.

The entertainment committee was headed by Tom H. Lathe, Wilson & Geo. Meyer & Co.; with the other members including Sidney Herzberg, Ontario Fertilizer Works, Ontario, Calif.; and S. C. MacMurray, American Potash & Chemical Co.

•

Pacific Group Elects

Edward Schuler, Monsanto Chemical Co., San Francisco, Calif., was elected president of the Pacific Insecticide Institute at the group's 21st annual meeting at the Hotel Claremont, Berkeley, Calif. October 10. Mr. Schuler succeeds David T. Prendergast of the Dow Chemical Co., (Great Western Division), San Francisco. Other officers elected were A. M. Esberg, Eston Chemicals, Inc., Los Angeles, vice-president and W. D. Gray, secretary-treasurer, to succeed himself.

Directors named were E. F. Basher, E. C. Cody, Elmer J. Davis, E. T. Doyle, Wallace Durham, A. M. Esberg, G. A. Fitzpatrick, Edw. H. Littooy, David T. Prendergast, Edward Schuler and M. F. Wharton.

Wheeler New CSC Director

Maynard C. Wheeler, vice president in charge of production of Commercial Solvents Corporation, has been elected to the Corporation's

MAYNARD C. WHEELER

Board of Directors, it was announced by Major T. P. Walker, Chairman of the Board. Mr. Wheeler joined Commercial Solvents in 1923 as a chemical engineer. He became manager of the Terre Haute plant in 1929, and later, production manager for all CSC plants. In 1945 he was made vice president in charge of production.

Mr. Wheeler is a Director of Thermatomic Carbon Company, Sterlington, La. He is an alumni counselor of the Purdue Research Foundation and a member of the American Chemical Society and the American Institute of Chemical Engineers.

•

Morrison to New Post

Kenneth D. Morrison, formerly vice president in charge of the Mixed Fertilizer Division of the Davison Chemical Corporation, Baltimore, has been appointed assistant to the chairman of the board of directors of the Naco Fertilizer Company, a subsidiary of W. R. Grace & Co. The appointment was to become effective Nov. 1. He will maintain his headquarters in New York.

THE INSECTICIDE MANUFACTURER FACES HIS CRITICS

Even with the overwhelming evidence in favor of the use of insecticides, the manufacturer often encounters alarmist criticisms of his products.

One of the functions of the National Agricultural Chemicals Association is the presentation of the facts about insecticide materials. Through a continuing educational program, the Association carries the true story of the insecticide manufacturer to the farmer, government, the medical profession, schools, and even to the housewife.

Only through organization can Industry effectively combat rumor with the powerful weapons of truth and fact.

National Agricultural Chemicals Association

Barr Bldg., 910 17th St., N.W. Washington 6, D. C.

Washington Rebounds . . .

IT begins to look more and more as if the findings of the Food and Drug Administration's toxicity residue hearings will not be translated into any decisions affecting actual application of insecticides and other agricultural chemicals in the field before the 1952 growing season. The FDA has just announced that the date for the filing of briefs has been extended to December 15. Following careful study of these briefs, preliminary findings can scarcely be expected for another two or three months at the earliest. And we hazard the guess that these preliminary findings will be kicked about and cut up a bit before the final findings can be agreed upon. Yes, it looks like 1951 will be well advanced, and insecticides for use this season necessarily well along toward the users, or perhaps even on the crops, before the findings of the hearing can be translated into definite recommendations.

* * *

With the FDA hearings just over, and the referee's desision not yet announced, the industry is in for another contest in the same Washington ring. The Delaney Committee, the Congressional committee authorized by the Sabath Resolution to investigate chemical residues on foods, is set to meet in Chicago, November 15-17. No list of witnesses to be called has yet been announced. The committee will reconvene in Washington November 28, with Lea Hitchner, executive secretary of the National Agricultural Chemicals Association scheduled to appear as the first witness. Representatives of the Manufacturing Chemists Association and the National Fertilizer Association are also to testify. See our December issue for their testimony.

* * *

Bernard D. Levinson, who presided at the FDA hearings, will be one of the speakers at the A.A.E.E. national convention in Denver, December 18-21. He should at least have some unofficial word as to what may be expected in the way of changing recommendations.

Allethrin has just been approved for inclusion in insecticide aerosols. (See Pg. 64.) This could mean production might be started on a commerical scale. A test batch of this pyrethrum substitute was made some time ago, but the product has never gone into real commercial production. Apparently the manufacturers were waiting to find a definite field of use for it before making any substantial quantity.

* * *

A Fertilizer Industry Advisory Committee is shortly to be appointed, we hear over the Washington grapevine. Names are now under consideration and the personnel of this committee should be announced momentarily.

* * *

Dr. Harold H. Shepard has been placed in charge of the USDA's defense production program pertaining to pesticides. With the anticipated increases in cotton acreage for 1951, the insecticide supply situation next season could be even more serious than it was in 1950. The benzol and chlorine shortages continue to plague producers. Raw material difficulties offer a serious threat to insecticide production for 1951. Interested government agencies, as well as the NACA, are promoting a "Buy Early" program. If 1951 proves to be another peak infestation year, DDT, BHC, chlordane, toxaphene, sulfur, may be even more difficult to latch onto than they were this season.

* * *

And those buyers who have perenially shopped around, and have no regular historical source of supply, will again be on the short end of things, as they were during the war. It is their screams that will reach the ears of the new group of Washington allocaters. The new NSRB set-up under Symington, incidentally, is just getting organized,—with the successors to the war-time WPB getting their spheres of influence mapped out, trying to determine jurisdictional questions, and incidentally developing a new brand of Washington double talk that will confuse the uninitiated, but be perfectly understandable to those who know the ropes. Us, we're still confused!

Ohio Meeting Held

The Ohio Lime and Fertilizer Conference will be held December 1st at the State Office Building in Columbus, according to Dr. Garth W. Volk of Agronomy, Ohio State University, secretary of the group.

•

Yakima Meeting Under Way

The second annual Aerial Application Conference was to be held at Yakima, Washington, November 2 & 3, under the sponsorship of the Washington State Aeronautics Commission, the Institute of Agricultural Sciences of the Washington State College and the Washington State Department of Agriculture.

•

Joe Noone Married

Joseph Noone, Technical Adviser of the National Agricultural Chemicals Association, and Miss Berenice E. Ackerman of Philadelphia were married October 12th. The couple returned to Washington in late October after a Florida tour. They will be at home in their Washington apartment in early November.

MEETINGS

American Phytopathological Society Peabody Hotel, Memphis, Tenn., Dec. 1, 2, 3, 1950.

Chemical Specialties Mfgrs. Association, New Yorker Hotel, New York, Dec. 4 & 5.

Cotton Insect Control Conference, Peabody Hotel, Memphis, Tenn., December 7 & 8.

North Central Weed Control Conference, Milwaukee, Wisconsin, December 12-14.

Iowa State Fertilizer Conference, Ames, Ia., December 12-14.

American Association of Economic Entomologists, Denver, Colorado, Dec. 18-21.

Northeastern Weed Control Conference, New Yorker Hotel, New York, January 3-5.

Cornell University Arborist's School Ithaca, N. Y., January 15 & 16.

Association of Southern Agricultural Workers, Peabody Hotel, Memphis, Tenn, Feb. 5-7, 1951.

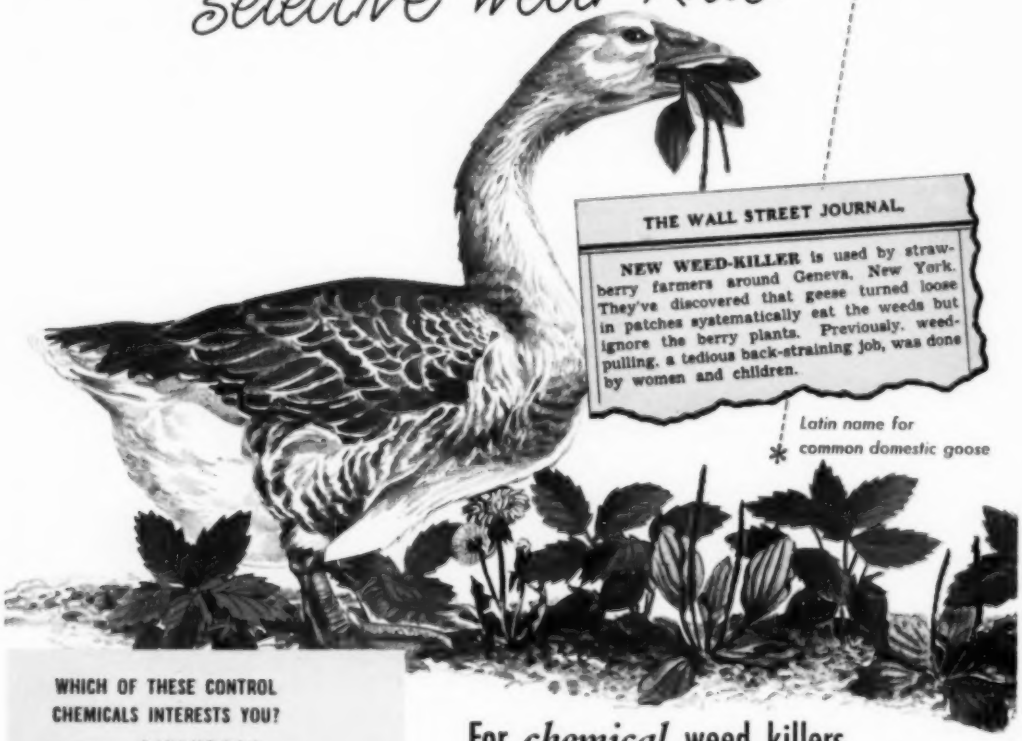
Southern Weed Conference, Hotel Claridge, Memphis, Tenn., Feb. 8 & 9.

Midwestern Chapter, National Shade Tree Conference, La Salle Hotel, Chicago, Ill., Feb. 14-16.

Kansas State Weed Conference, Topeka, February 15 & 16, 1951.

N. Central Branch, A.A.E.E., Commodore Perry Hotel, Toledo, Ohio, March 21 & 22.

Anser Tolousis...* selective weed killer



WHICH OF THESE CONTROL CHEMICALS INTERESTS YOU?

Selective and General Type Weed Killers	2, 4-D Acid Technical Sodium Salt 2, 4-D Monohydrate 2, 4-D Technical Esters (Butyl, Isopropyl) Low Volatile 2, 4-D Ester 2, 4-D Amine Weed Killers 2, 4-D Ester Weed Killers 2, 4, 5-T Acid Technical Brush Killers 2, 4, 5-T Brush Killer
Organic Phosphate Insecticides	Parathion Technical Parathion Liquid and Wettable Formulations Metacide—Systox
Organic Insecticides	BHC Technical 10 Gamma BHC Dust Concentrate Lindane Concentrates DDT Formulations Toxaphene Concentrates Chlordane Concentrates DNOC Technical Aldrin—20 Dieldrin Formulations
Fungicides	Spergon Formulations Phygon Formulations

Other agricultural chemicals include Rodenticides, Cotton Sprays and Dusts, Sequestering Agents, Wood Preservatives, etc.

For *chemical* weed killers see Pittsburgh!

Already famous in song and legend, the ludicrous looking goose (Anser Tolousis) now attracts attention as the weed wizard of the strawberry patch! More power to this barnyard character, but . . .

For most agricultural weed control applications you can put full dependence on the *chemical* type weed killers produced by *Pittsburgh*.

In addition to selective type weed killers the *Pittsburgh* chemical control line includes organic insecticides, organic phosphate insecticides, and fungicides. In two short years these have won an enviable reputation for purity, uniformity and working effectiveness. There's a reason—*Pittsburgh* is a *basic* producer of most of these high quality chemicals.

Write for full technical information.

PITTSBURGH AGRICULTURAL CHEMICAL CO.

6505-A Empire State Building • 350 Fifth Ave. • New York 1, N.Y.
OFFICES: Chicago • San Francisco • Denver • Tampa • St. Louis

Division of
PITTSBURGH COKE & CHEMICAL COMPANY
Grant Building • Pittsburgh 19, Pa.

New Pennsalt Plant in Ala.

A new plant for the blending, formulating and production of agricultural chemicals is being installed by the Pennsylvania Salt Manufacturing Co. at Montgomery, Ala., it has been announced. From this new plant, the company expects to make available to growers in the southeast a complete line of agricultural chemicals for use on cotton, peanuts, soybeans, potatoes and other crops and on livestock.

White Watson

J. Drake Watson, formerly technical sales representative for the southeast in the Agricultural Chemicals Department, has been named district manager for the area and will make his headquarters at the Montgomery plant. Richard O. White, formerly superintendent at Pennsalt's Cornwells Heights, Pa., plant, has been appointed superintendent for the new operation.

Mr. Watson is a native of Florence, S. C., has been with the company since 1948.

Mr. White is a native of Rutherford, Tenn. He joined Pennsalt in 1945.

TECHNICAL BRIEFS

(Continued from Page 64)

A. Rohwer, assistant chief of the Bureau of Entomology and Plant Quarantine, U.S.D.A. The announcement contained the following comments concerning allethrin: in freedom from toxicity, it is comparable with the pyrethrins which have long been used in aerosols. In accepting formulas containing allethrin, it will required that the material used be of a purity not less than 75% allethrin. The allethrin content of the commercial product used in preparation of the aerosol should be indicated as determined by the hydrogenolysis method of analysis. The percentage of the related products should also be stated in the formulas submitted for review.

•

New Office for Spencer

Spencer Chemical Company has announced the opening of its new southeast district sales office in Atlanta, Georgia, through which it will serve a territory consisting of Georgia, Alabama, Florida, South Carolina, and the eastern part of Tennessee with agricultural nitrogen products.

In charge of the office, located at 412 Candler Building, is John L. Sanders, district sales manager, who has been a member of the Spencer sales organization since 1946. For the past three and one-half years

he has represented the company in Iowa and was located previously in Louisiana.

The new Atlanta office also serves as headquarters for Floyd N. Miller, district technical service representative, who is available to customers as a technical consultant. Sales representatives for the states in the southeastern territory will be under the supervision of the Atlanta office.

Ferti. Application Meeting

Program details have been completed for the 26th annual meeting of the National Joint Committee on Fertilizer Application which is to be held jointly with the Power Machinery Division of the American Society of Agricultural Engineers in Chicago, December 18.

Manufacturers of fertilizer materials, and application equipment will be represented on the program, as will the U. S. Department of Agriculture and experiment stations. Dr. A. L. Lang, University of Illinois, will preside at the session which will start at 9:45 Monday morning, Dec., 18. The program follows:

"Improvement of Soil Productivity by Soil Management and Through the Use of Chemical Fertilizers and Organic Materials," by Frank W. Parker, U. S. Department of Agriculture. "Review of Commercially Available Fertilizer Distribution Equipment and the Kodachrome Slide Library," by Glenn A. Cummings, U. S. Department of Agriculture: "Special Equipment Development for Experimental Application of Fertilizers," by O. C. French, Agricultural Experiment Station, Cornell University, Ithaca, N. Y. "Where Should the Fertilizer be Placed for Corn?" will be answered by George D. Scarseth, American Farm Research Association; and the "Most Promising Methods of Application of Fertilizers to Pastures," by D. R. Dodd, Ohio State University.

The afternoon session will continue with a discussion on "Principles Involved in the Placement of Fertilizer on Truck Corps," by C. H. Mahoney, National Canners Association; and J. D. Barnard, Minnesota Valley Canning Co. The remainder of the program will include the following:

"Present Status of Use of Liquid and Gaseous Fertilizers, Their Advantages and Limitations," by Proctor W. Gull, Spencer Chemical Company, Kansas City, Mo.; "Aircraft Application of Fertilizers," by M. H. McVickar, The National Fertilizer Association, Washington, D. C.; "The Fertilizer Manufacturer's Problems. What Can Be Expected in Improved Physical Characteristics of Fertilizers to Aid the Farm Implement Manufacturer?" by Maurice H. Lockwood, International Minerals & Chemical Corp., Chicago; and a symposium on "The Fertilizer Equipment Manufacturer's Problems in Design," with a panel consisting of C. E. Guelle, International Harvester Company, W. W. Trantor, A. B. Farquhar Company, W. A. Hyland, Van Brunt Mfg. Company.

Spencer Advances Three at Kansas City

SPENCER Chemical Company, Kansas City, Mo., has announced the election of John R. Riley, Jr., formerly general sales manager, as vice-president in charge of sales, and John P. Miller, treasurer, as vice-president and treasurer.

Culpepper Riley Miller

Succeeding Mr. Riley as general sales manager, is Joe E. Culpepper formerly assistant general sales manager. He is a graduate of Mississippi State College, and joined Spencer in 1946 after broad experience in the fertilizer industry with American Cyanamid Company and the Synthetic Nitrogen Products Corporation. Orginally director of sales, fertilizer division, he was soon advanced to assistant general sales manager.

Mr. Riley is a graduate chemical engineer who has been associated with the firm since 1942. He served first in the operating division and then headed postwar utilization studies. When Spencer went into commercial operation, Mr. Riley took charge of the sales division. Prior to 1942, he was associated with Shell Petroleum Corporation and Dearborn Chemical Company.

Mr. Miller, formerly an executive with the accounting firm of Ernst & Ernst, joined Spencer Chemical Company at its inception and has headed its treasury division from the first. He is a graduate of the University of Missouri and a life-long resident of Kansas City.

Spencer is a producer of a wide variety of chemicals for industry and agriculture, with plants in Pittsburg, Kans., Henderson, Ky., Chicago, Ill., Charlestown, Ind. and Parsons, Kans.

Roth New CSC Entomologist

Dr. Roger W. Roth has joined Commercial Solvents Corporation, Agricultural Division, as entomologist, with headquarters in New York. Dr. Roth will work with

DR. ROGER ROTH

Federal and State Experiment Stations and insecticide manufacturers on the new CSC products designed for use in the insecticide, fumigant and fungicide field.

Prior to joining CSC, Dr. Roth was entomologist for Bell Aircraft Corporation, Buffalo, N. Y., where he made major contributions to the development of spray, dust, and fog equipment for application of insecticides by helicopter. His work covered an unusually wide variety of insect pests and materials used in insect control on major crops throughout the United States and in South America. He is recognized for developments in aerosol fogging technique for black fly and mosquito control.

•

Dow Opens Ammonia Plant

Dow Chemical Co. has announced completion of its new ammonia plant at Freeport, Texas. The new unit will produce both refrigeration and technical grade anhydrous ammonia. The latter will be used for direct fertilization of soil on the west coast and in the Delta region of Arkansas, Louisiana and Mississippi. Picture of the new ammonia compressors appears on the front cover this month.

NFA Presented Award

The public relations program of the National Fertilizer Association was honored with an award from the American Trade Associa-

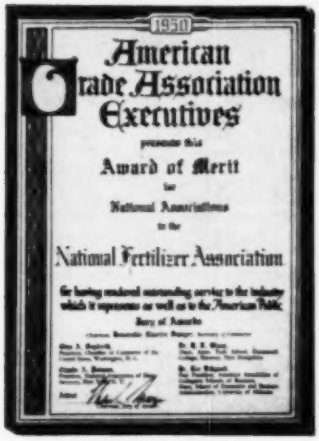


PHOTO OF AWARD

tion Executive group. A certificate of honor was presented to W. E. Chace, NFA chief of information, at a meeting in Boston recently.

The jury of awards, headed by Secretary of Commerce Charles Sawyer, cited the NFA "especially for its long-range program of research, education and trade promotion."

•

Cotton Insect Conference

The fourth annual Cotton Insect Control Conference is scheduled to be held December 7 & 8 at the Peabody Hotel, Memphis, Tenn. Program plans were not complete at press time, but according to Hal C. Dilworth of the National Cotton Council of America, speakers would represent the U. S. Department of Agriculture, the insecticide manufacturing industry, custom spray operators, cotton growers, and southern entomologists.

Subjects slated for discussion include the role of cotton in the national emergency; problems in providing adequate supplies of pesticides; the insecticide outlook for 1951; equipment and application techniques; insect control in a balanced cotton production program; and the interrelationship of insect control, defoliation and cultural practices. Other talks are to cover the pink bollworm situation, cotton production in general, research highlights in the cotton belt during 1950; and comments on the 1951 state recommendations.

•

Baughman Convention

A convention for distributors of the Baughman Manufacturing Company was held at the company's factory, Jerseyville, Illinois, Monday, Tuesday and Wednesday, November 6, 7 and 8, to acquaint distributors with the complete line of Baughman equipment and to outline sales and advertising plans for 1951. The meeting closed with a banquet Wednesday night, in the main dining room of Pere Marquette Lodge on the Illinois River.

Baughman manufactures belt, screw and chain and flight conveyors, belt and bucket elevators and self-unloading bodies.

N. Central Weed Program

Program arrangements have been completed for the three-day meeting of the North Central Weed Control Conference to be held at Milwaukee December 12-14, the committee in charge states. The meetings, with headquarters in the Schroeder hotel, will be opened by the Association president, W. W. Worzella, head of the Department of Agronomy, South Dakota State College, Brookings, S. D., followed by a guest speaker, F. W. Went, Kerckhoff Laboratories of Biology, Calif. Institute of Technology, Pasadena. His subject: "The Role of Environment in Weed Growth."

The afternoon session of the first day is divided into four sections. These will include: 1) discussions of weed control in horticultural crops and sugar beets, under the chairmanship of G. F. Warren; 2) industry problems, including a symposium on cooperation between industry and the state, with R. L. Brandenburger as chairman; 3) regulatory weed work, with Charles J. Gilbert as chairman; and 4) aerial spraying, with Walter F. Ball as chairman. Evening sessions of the first day will hear a discussion of "Plans for a Sound Regulatory Program," and sessions on extension activities and horticulture.

R. S. Dunham is chairman of the morning session on Wednesday, to discuss new developments in chemical weed control in crops. The afternoon program will discuss various methods of chemical application, and a session on botany and plant physiology, in connection to the action of herbicides on the plant.

The annual banquet will be held on Wednesday night with the guest speaker being Rt. Hon. J. G. Gardiner, Minister of Agriculture, Ottawa, Canada. His subject will be "Our Common Heritage."

Thursday's sessions will include a morning discussion on the use of chemicals on railway rights-of-way, power transmission and telephone lines; and the afternoon will be devoted to talks on new herbicides, the control of woody plants, and a final business session.

Present officers of the N. C. W. C. C. are: W. W. Worzella, president; H. E. Wood, Commissioner of Weeds, Winnipeg, Canada; and secretary-treasurer, Dr. Oliver Lee, Purdue University, Lafayette, Indiana.

•

Material Handling Show

Preliminary announcement has been made on the conference on Materials Handling set to be held in Chicago, April 30 to May 4.

CONTROL OFFICIALS

(Continued from Page 37)

necessary practice in modern agriculture, he concluded.

A discussion of the public health aspects of the newer insecticides was presented by Dr. J. H. Townsend, chief of the Industrial Hygiene Division of the U. S. Public Health Service, Washington. Emphasizing the need for education at the use level, Dr. Townsend declared that every farmer using pesticides must be

reached with some kind of educational program. He pointed out that ignorance on the part of the users leads to bad records which bring about restrictive legislation such as has already been introduced in some states. "It will be either education or restrictive legislation," he warned. And we must move quickly, he added.

The speaker commended the manufacturers, mixers, blenders and other handlers of pesticides for their safety efforts, stating that there is no reason why these materials cannot be controlled completely to avoid accidents. The problem involved is three-fold, he said, embracing industrial, agricultural and public health factors.

However, the industry has done an outstanding job along educational lines in many respects, he said, citing as an example posters put out by the American Cyanamid Co. instructing pilots of airplanes about the toxic effects of parathion and presenting complete information on the subject.

Wm. O. Buettner, executive secretary, National Pest Control Association talked on "Sound Regulatory Requirements as Viewed by the Pest Control Industry." He said that although the physical amounts of pesticide materials used by his industry in sanitation and household insect control work, are relatively small, yet the operators were in daily contact with the materials. He stated that there should be no premature conclusions regarding toxicity of materials, and indicated that there are some instances where improvement can be made in the wording of labels regarding the "use as directed" instructions. He expressed the feeling that the real danger of some toxicants is obscured by implications that the material is "safe." In seeing the word "safe," he declared, the average reader receives the impression that the material may be non-poisonous. He also disagreed with a tendency to overstate on labels, the residual properties of certain products.

Dr. B. E. Conley, secretary of the Committee of Pesticides of the Council on Pharmacy and Chemistry, American Medical Association, Chicago, pointed out to the group that the lack of standardization is one of the weakest links in the encouraging of proper use of pesticidal materials. The newer ones, because of their lack of precedent in actual use, pose a particularly complex problem. With neither knowledge nor experience to acquaint the user with their characteristics, it will take some time to work out all of the details, he said, but proper labeling does help to clarify the situation.

Dr. Conley asked the question, "What is safe practice?", and then described experimental efforts now under way. Preliminary studies, he said, are to classify recognized hazards of each chemical group, and then to determine the relative degree of importance in their several uses.

In conclusion, Dr. Conley invited the control officials to participate in the development of proper standards. Promotion of such on the state and local level, is helpful, he averred.

New Co-op Plant Opens

Magee Cooperative Gin, a farmer-owned enterprise at Magee, Miss., had under construction this past summer a plant for manufacture of agricultural chemicals used by its members. Principal product will be insecticides for control of cotton insects, but other purpose insecticides and fungicides will also be made. The Magee co-op also operates a fertilizer mixing plant which has recently been completely mechanized. This has increased capacity and reduced labor requirements from thirty-six men to eight. Excess volume of both fertilizer and economic poisons from the plants will be marketed through other Mississippi cooperatives.

•

AAEE Branch to Toledo

The North Central States branch of the American Association of Economic Entomologists has changed the location of its 1951 meeting from Michigan State College, as first planned, to the Commodore Perry Hotel, Toledo, O. Dates for the meeting at Toledo will remain the same, Wednesday and Thursday, March 21 and 22, 1951.

The change, according to announcement by the program committee, was made because a new building on the Michigan campus, in which the group had planned to meet, will not be completed by next March as anticipated earlier and Lansing hotels could not accommodate the visitors on other dates.

Meanwhile the program committee is seeking suggestions for topics to be considered at the Toledo conference. Members have been requested to send their ideas at once to R. Keith Chapman, dept. of economic entomology, Univ. of Wisconsin, Madison 6, Wis.

•

Coke Oven Bur. Moves

The Coke Oven Ammonia Research Bureau has announced a change of address in Columbus, Ohio. H. H. Tucker, director of the Bureau, states that after October 30, the organization's offices will be located at suite 805, Atlas Building, 8 East Long Street, Columbus 15, Ohio.

DILUENTS

(*Continued from Page 47*)

organic phosphate insecticides—parathion and tetraethyl pyrophosphates. In extended storage where moisture is present, rotenone and pyrethrum are adversely affected by an alkaline diluent.

Allen and Brooks (1940) studying the effect of alkaline diluents on rotenone-bearing roots in storage, state that (after 7 days in damp storage) the toxicity of derris was reduced materially. Sulphur added to the diluent produced an acid pH and thus prevented this deterioration. Robinson and Hatch (1944) found that hydrated lime causes very rapid deterioration in moist but not in dry storage of rotenone dusts.

Wilson and Runnels (1937) and Horsefall and Hervey (1939)

have pointed out the deleterious effect of lime used as a dispersant on certain vegetables, especially tomato transplants. Lime excess has also been reported as injurious when used on walnuts. (Miller and Bollen 1946)

Goodwin et al (1941-42 state that the pH value of the separate ingredients used in dust mixtures do not always afford reliable indices for predicting the pH of the mixtures. Many diluents buffer or react with the other ingredients of the mixture. They found that in a mixture having a pH above 5.5, very little water-soluble copper was in evidence, while below this point, e. g. pH 5 or pH 4.5, amounts of soluble copper were sufficient to be injurious to plants.

The addition of a diluent could change the pH and make a dust or spray mixture safer for foliage application, and at the same time so inert as to be too slow in its fungicidal action to control the disease commercially. In other words, safeness to foliage is one thing and fungicidal or insecticidal activity is still another. Diluents and chemicals must be used to make the *mixture* safe to use on foliage and at the same time must not decrease the pesticidal activity below a point that will give commercial control.

Absorbing Power

ABSORBING power, as related to an agricultural diluent, represents the measure or ability of the diluent to take up a liquid and at the same time maintain a free flowing condition. As a rule, clays are most efficient in this respect. The degree of tightness with which the liquid is held is also of importance. Some clays, such as bentonite, have a high absorbing power, but they "tie-up" the liquid so tightly that it is released too slowly for the insecticide to be effective. This happens in nicotine dusts containing bentonite.

Many dusts are improved by the addition of oils or other liquid insecticides. In this case, the absorbing power of the diluent is very important as it must be able to take up the liquid and at the same time maintain a free-flowing condition.

The absorbing power of a diluent is vital in preparation of wettable powders from liquid insecticides. These wettable powders frequently contain as much as 25% to 50% of the liquid insecticide concentrate. Examples are parathion 25% wettable; chlordane 50% wettable; methoxychlor 50% wettable powders.

Part II, concluding this article, will appear in our December issue.

FUNGICIDES

(*Continued from Page 59*)

Under the above conditions it was necessary to make a total of 11 applications.

The following materials were used at the amount per 100 gallons of water noted:

"Bioquin I" (copper-8 quinolinolate 100% active material) 1 pound

"Karathan WP - 25" (dinitro capryl phenyl crotonate 22.5%, other nitrogen derivatives chiefly dinitro capryl phenol 2.5%, inert ingredients 75%) 1½ pounds

"Dry Parzate" (zinc ethylene bisdithiocarbamate 65%, inert ingredients 35%) 2 pounds

"SR - 406" (N - trichloromethylthio-tetrahydrophthalimide 50%, inert ingredients 50%) 4 pounds of wettable powder

"Caloclor" (mercurous chloride 65%, mercuric chloride 30%, inert ingredients 10%) 2/3 pound plus "Cadminate" (cadmium succinate 60% , inert ingredients 40%) 1/6 pound.

The check plots were treated the same as all other plots except that no fungicide of any kind was applied to them.

The plots were rated twice by inspection, once when spraying was terminated and again at harvest time. In each case the placement of each of the materials was consistent in all 6 replicates. The plots treated with "Dry Parzate" were best; those sprayed with SR—406 were second; "Bioquin I" and "Karathane WP-25" were about equal and were placed third; the "Caloclor"- "Cadminate" mixture was fourth. Repeated application of this mixture at the con-

centration used caused severe burning. The checks at each time of rating were rated poorest.

The ears from each plot were harvested and weighed. With a few exceptions individual plot weights could be correlated with the inspection ratings. Taking the average yield weight of the 6 check plots as unity, the average yield weight of the 6 plots treated with each material was as follows: "Dry Parzate," 3.76; SR-406," 3.16; "Bioquin I," 2.29; "Karathane WP-25," 2.2; "Caloclor," 1.46.

The husked ears from each plot in each replication were visually compared, and there was a definite difference between treatments. The checks (untreated) had only a few grains on a few of the ears. Filling of ears from plots treated with "Dry Parzate" and "SR-406" was good; from the "Bioquin I" and "Karathane WP-25" plots poor. Ears from the "Caloclor" treatments were not much better than the checks. These findings correlated with the inspection ratings and the average yield-weight ratings.

The consistent differences shown in these ratings are large enough in the case of the 2 best materials, "Dry Parzate" and "SR-406," to offer hope that these materials can be used to control this disease on sweet corn. It should be emphasized, however, that the control was obtained on an experimental basis, and that further investigation will be necessary before these materials can be recommended for commercial use.

NO OFF-FLAVOR

(*Continued from Page 33*)

effect. On Egbert muck 13.3 ounces of gamma isomer had no apparent effect on the vines. Cost of the material is comparatively low and the application expense can be disregarded since water is practically always used in transplanting tomatoes. The added operation is merely to add the insecticide to the tank as it is being filled.

The purified form of benzene hexachloride however, is shown in these experiments and by extensive field experimentation to be effective not only in protecting tomato transplants, but also in reducing to a minimum the chance of affecting adversely the flavor or quality of the canned product.

Acknowledgment is hereby made by the authors for the review and suggestions in the preparation of this paper by W. H. Lange and H. Madisen, members of the Division of Entomology, University of California, and the University of California Extension Service, respectively.

Literature Cited

Davis, Lyle L. 1949 Benzene hexachloride in processed peaches, *Food Packer* 29 (8):35,36,70.

Davis, Lyle L. 1948 Benzene hexachloride in canned peaches. *Food Technology* 2:303-7.

Lange, W. H., E. C. Carlson and L. D. Leach, 1948 A progress report of Investigation Dealing with the control of worms. (Memo). University of California, College of Agriculture.

O'Kane, W. C. 1947 Results with benzene hexachloride. *Journal Economic Ent.* 40(1): 133-4.

Stitt, Lloyd L. and Evenson, J. vegetables grown in soil treated with insecticides. *Jour. Econ. Ent.* 42(4):614-17.

Arborist School in Jan.

A school for arborists will be held at Cornell University on Monday and Tuesday, January 15 & 16, 1951, according to Dr. A. M. S. Pridham of the department of floriculture and ornamental horticulture of Cornell. The course will be open to all members of the trade, he says.

•

Fertilizer Officers Named

Officers and directors of the Planters Cotton Oil and Fertilizer Company were elected at the forty-seventh annual meeting of the stockholders held Sept. 7, at the plant, Rocky Mount, N. C. One new director, Benjamin B. Woodard, was named and a number of advancements among officers were listed.

The following directors of the company were elected by the stockholders: Robert D. Gorham, W. Maurice Daughtridge, DeLeon Carter, Milton P. Dawson, R. Russell Braswell and Benjamin B. Woodard.

After the meeting of the stockholders, the directors elected the following officers of the company: Robert D. Gorham, president; W. Maurice Daughtridge; John D. Robbins; William T. Melvin; and George W. Gorman, Jr., vice-presidents; Theo. H. Pitt, secretary and James L. Murphy, treasurer.

SCREWWORMS

(*Continued from Page 57*)

that this new remedy is not the entire answer to screwworm control. They urge livestock owners in screwworm-infested areas to examine their animals at regular intervals and to treat infested animals immediately upon discovery. Operations or other wounding livestock management practices should be avoided during the screwworm season. When necessary to de-horn, brand, or perform operations of this sort, the new remedy should be applied promptly. Wounded animals should be watched carefully and retreated at 7-day intervals until the wounds have healed. Severely infested wounds should be treated 3 or 4 days following the first treatment, and at 7 day intervals thereafter until healed.

The formula of "EQ 335" can also be diluted with water and used to treat sheep infested with wool maggots. These are the larvae of certain kinds of blowflies, which cause serious losses of sheep in some parts of this country. One part of "EQ 335" is diluted with 9 parts of water and the liquid is applied to the infested portions of the sheep.

WEED CALCULATIONS

(*Continued from Page 41*)

nomogram, one must know the cost per gallon of the commercial product and the pounds of active ingredients in that gallon. For example given CPG = $9.00 and PPG = 3.50 lbs. . . . connect $9.00 on CPG scale with 3.50 on PPG scale and read the answer $2.57 on the CPP scale.

STATEMENT OF OWNERSHIP

Statement of the ownership, management, and circulation required by the Act of Congress of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) of Agricultural Chemicals, published monthly at Baltimore, Md., for October 1, 1950.

1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Industry Publications, Inc., 254 W. 31st St., New York, 1, N. Y.; Editor, Lawrence A. Long, 254 W. 31st St., New York, 1, N. Y.; Managing Editor, Wayne E. Dorland, 254 W. 31st St., New York, 1, N. Y.; Business Manager, Thomas Morgan, 254 W. 31st St., New York, 1, N. Y.

2. The owner is: (If owned by a corporation; its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

Industry Publications, Inc., 254 W. 31st St., New York, 1, N. Y.; Ira P. MacNair, 254 W. 31st St., New York, 1, N. Y.; Wayne E. Dorland, 254 W 31st St, New York, 1, N. Y.; James Duncan MacNair, 254 W. 31st. St., New York 1, N. Y.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.).....

signed IRA P. MacNAIR, Publisher

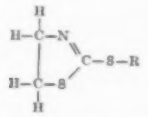
Sworn to and subscribed before me this 8th day of September, 1950.

HARRIET LEVINE

(seal) (My commission expires March 30, 1952.)

Industry Patents

2,516,313. Insect Controlling Composition Comprising an Alkyl 2-Thiazolinyl Sulfide. Patent issued July 25, to A. H. Goddin, Newark and N. E. Searle, Wilmington Del., assignors to E. I. duPont de Nemours & Co., Wilmington. An insecticidal and insectifugal composition containing as an essential active ingredient in a mixture with a wetting agent a compound having the formula in



which R is an alkyl radical containing at least four carbon atoms.

2,519,649. Seed Treating Machine. Patent issued August 22, 1950, to Benjamin Franklin Gustafson, Fargo, N. D. A seed treating machine comprising a base, a seed hopper carried by said base, a conveyor housing below said hoppers, an insecticide hopper carried by said base, a conveyor in said housing, said hoppers communicating at the lower ends thereof with said housing, adjustable valve means controlling the discharge of seed from said seed hopper, adjustable valve means controlling the discharge of insecticide from said insecticide hopper, means for rotating said conveyor and means carried by one of said hoppers extendible into said conveyor housing for retarding the movement of the seed engaged by said conveyor.

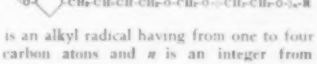
2,519,707. Combination Fertilizer Distributor and Watering Can. Patent issued August 22, to Arthur Schaffer, New Lisbon, N. J., assignor of one-half to Philip Rieck, New Lisbon, N. J. A dispenser comprising a container having a lower portion including a delivery opening, guide means carried by the container, a valve operator slidably carried by the guide means, a valve on said operator for controlling the flow of material from the delivery opening, and an agitating means journaled for rotation on said operator and actuated independently of said operator.

2,519,780. Herbicidal Formations. Patent issued August 22, 1950, to Henry L. Morrill, Clayton, Mo., assignor to Monsanto Chemical Co., St. Louis. A new composition of matter comprising a water soluble salt of 2,4-dichlorophenoxyacetic acid and a minor amount of the condensation product of one part by weight of a compound selected from the group consisting of abietic acid, tall oil, rosin and mixtures thereof, and from about 0.5 part to about 2.0 parts by weight of ethylene oxide.

2,521,318. DDT Suspension. Patent issued September 5, to H. C. Wohlers and T. C. Davis, Saint Louis, Mich., Assignors to Michigan Chemical Corp., Saint Louis, Mich. A method for the preparation of a water-dispersible parasiticidal concentrate, the steps which include: melting DDT in quantity at least about 37 percent by weight of the total concentrate, an emulsifying agent which is a non-ionic ether-type agent, containing ether groups as the hydrophyiic part of the molecule, and if hydroxyl groups are present, at least one ether group per hydroxyl group, and oil in a quantity not less than about 37 percent by weight of the DDT, at least a portion of said oil being a DDT solvent oil, the combined DDT and oil representing from about 50 to 75 percent by weight of the total concentrate, mixing the liquid mixture with agitation with from about 25 to 50 percent of water by weight of the total concentrate, said water being at a temperature above about 90 degrees centigrade, and colloidizing and cooling the emulsion thus produced to form a suspension of solid DDT particles.

2,521,424. Fungicidal Composition Comprising a Copper Acetylide. Patent issued September 5, to Miller W. Swaney, Cranford, N. J., assignor to Standard Oil Development Co. A fungicidal composition consisting of a copper acetylide as the active ingredient and an inert clay carrier therefor, said inert carrier being in the weight ratio of at least 2 to 1 to said copper acetylide.

2,521,366. Insecticidal and Synergistic Products. Patent issued September 5, to O. F. Hedenburg, Pittsburgh, Pa., assignor to Rex Research Corp., Toledo, Ohio. The new organic chemical product having the structural formula: in which R



is an alkyl radical having from one to four carbon atoms and n is an integer from one to two.

2,522,311. Insecticidal Compositions. Patent issued Sept. 12, to H. G. Smith, Wallingford, M. L. Hill, Boothwyn, and T. L. Cantrell, Lansdowne, Pa., assignors to Gulf Oil Corp., Pittsburg, Pa. An insecticidal composition comprising the toxicants 2,2, bis (parachlorophenyl. 1,1,1-trichloroethane and pyrethrins, a solvent therefor and a small but stabilizing amount of an azomethine compound having the following formula: wherein R_1 and R_2

represent aromatic groups.

Trade Mark Applications

Fly-Nix, in capital letters, for insecticides. Filed Jan. 30, 1948, by Western Chemical Co., St. Joseph, Mo. Claims use since Dec. 20, 1926.

Resid-U-Nox, in capital letters, with first and last letters double size, for insecticide. Filed July 28, 1948, by The Farnam Company, Omaha, Nebr. Claims use since Apr. 15, 1948.

Penesote, the word appearing twice in "X" arrangement, for chemical wood preservative. Filed Dec. 9, 1948, by Interchemical Corp., New York. Claims use since Nov. 16, 1948.

Cadminate, in caps and lower case for agricultural fungicide. Filed May 23, 1949, by Mallinckrodt Chemical Works, St. Louis, Mo. Claims use since May 4, 1949.

Dr. Salsbury's, in capital letters, for preparation for killing rats and mice. Filed Aug. 4, 1949, by Dr. Salsbury's Laboratories, Charles City, Ia. Claims use since Feb. 16, 1913.

P. C. & C. Co., with letters arranged in hexagonal boxes, for alpha-naphthylthiourea, and other chemical products. Filed Nov. 8, 1949, by Pittsburgh Coke & Chemical Corp., Pittsburg, Pa. Claims use since Oct. 6, 1948.

Ambrocide, in outline capital letters, for insecticide in concentrate and liquid form for control of insect attacks on freshly cut logs and lumber. Filed Mar. 17, 1949, by Chapman Chemical Co., Memphis, Tenn. Claims use since Dec. 18, 1939.

Tobacine, in heavy capital letters, for insecticide. Filed Feb. 1, 1949, by Anco Laboratories, Henderson, Ky. Claims use since Nov. 25, 1945.

Exelol, in Cooper capital letters, for parasiticides, namely, insecticides and agricultural fungicides. Filed Feb. 5, 1949, by California Spray-Chemical Corp., Richmond, Calif. Claims use since Sept. 1, 1940.

Tesalt, in lower case letters, for chemicals for exterminating weeds. Filed June 30, 1949, by Sherwin-Williams Co., Ohio. Claims use since Sept. 28, 1948.

Trivex G-9, in capital letters, for insecticide. Filed Oct. 19, 1949, by the Food Machinery & Chemical Corp., New York. Claims use since June 24, 1948.

•

New DDT Plant in Texas

Kolker Chemical Works, Inc., Newark, have announced that construction is now under way on a new DDT producing unit at their Houston plant. This new addition will be operated in conjunction with their BHC plant.

Kolker's plant will be the first DDT producing unit in the Southwest and will greatly increase the company's output, which is also manufactured at their Newark plant. DDT is used on cotton and other crops in the southwest. Production should be available from the Houston plant early in 1951.

Classified Advertising

Rates for classified advertisements are ten cents per word, $2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, $1.00 minimum. Address all replies to Classified Advertisements with Box Number, care of AGRICULTURAL CHEMICALS, 234 W. 31st St., New York 1. Closing date: 25th of preceding month.

Positions Wanted:

Research-Sales: Degree in Range and Forestry, Texas A&M College. Two years experience with state research group on chemical control of weeds and brush. Prefer research or combination research/sales position. For details address Box No. 478, care of Agricultural Chemicals.

Position Wanted: Agricultural College graduate, 21, majored soils phase of Agronomy. Desires employment in field. Gerald Elkan, 67-68 Groton, Forest Hills, New York.

Plant Pathologist: Ph.D. minor plant physiology; highest qualifications; publications; young; desires fundamental research work in the chemical control of disease in U. S. or abroad. Experience in root rot research and soil fumigation. Address Box No. 479, care of Agricultural Chemicals.

Chemist: Ten years experience with degrees in biochemistry and bacteriology. Can handle plant, production, sales, insecticides, fungicides, germicides, and allied specialties. Excellent record. Best references. Desires new connection with manufacturer in any capacity where experience and training will court. For further information, address Box No. 480, care of Agricultural Chemicals.

Sales Representative—California— Currently employed chemical salesman with university degree desires change. Well acquainted with jobbers, dealers, compounders from bay area south. Open to offer with reliable, aggressive concern. Would consider handling several non-competing products on manufacturers representative basis. Address Box No. 482, care of Agricultural Chemicals.

Positions Open:

Agricultural Insecticide Salesmen: A client of ours has openings for three livewire salesmen of agricultural insecticides. To travel (1) the South, with headquarters in the South; (2) New England, with headquarters in New England; and (3) Midwest, with headquarters in Midwest. Selling is to dealers and distributors for reputable Eastern manufacturer. Method of compensation open. Reply, giving full details, The House of J. Hayden Twiss, Advertising, 225 Park Avenue, New York 17, N. Y.

Position Open: Pennsylvania agricultural chemicals jobber representing top-flight manufacturers seeks salesman to call on dealers. Offer good territory and possible share in company ownership to aggressive man who can produce results. Address Box No. 474, care of Agricultural Chemicals.

Assistant Sales Manager—about 40 years old, experienced arsenicals, organics, botanical insecticides for large established manufacturer located in the East (New York). Prefer technical background. Salary $8,000 to $10,000. Submit full resume to Box No. 475, care of Agricultural Chemicals

Sales Manager and Executive: Established formulator and mfgr. of spray equipment. Located in Iowa, heart of the market. A complete line with one product set for national distribution. May purchase part interest in company. Address Box No. 476, care of Agricultural Chemicals.

Manufacturers Agent: A bulk item with little competition. Good sales volume and profits. Sell jobbers and dealers. Exclusive territory for right man. For details write Box No. 477, care of Agricultural Chemicals.

For Sale:

For Sale: November 1950 to Spring 1951 delivery, 10% Gamma Benzene Hexachloride Dust concentrate and wettable powder. Pack fiber drums or 100# bags. Address inquiries to Chemical Formulators, Inc. Box 35 North-Charleston, W. Va. Also solicit inquiries for custom packaging, powder and liquid. Complete grinding blending and packaging service.

Wanted to Buy:

Plant Wanted: Wish to buy well established successful plant in Agricultural Chemical field. Medium size. Will buy capital stock or assets. Address Box No. 481, care of Agricultural Chemicals.

Miscellaneous:

If You Are Contemplating relocating, you should request a copy of "Business Opportunities in Watertown, South Dakota." Call or write Mayor Gilbert or the City Promotional Director, J. G. Ihnet.

Ohio Pesticide Meeting

Program plans for the fourth annual meeting of the Ohio Pesticide Institute are complete for the two-day conference. The dates are November 28 and 29, with headquarters at the Deshler-Wallick Hotel, Columbus, O.

Mason Kirkland, president of the O.P.I. will address the group, followed by a panel discussion on "Up-To-Date Insecticide Usage." Moderator of this panel will be T. H. Parks, Ohio State Extension Service, with other participants C. R. Cutright, J. P. Sleesman, Roy Rings, R. B. Neiswander and C. R. Weaver, all of the Ohio Agricultural Experiment Station, and V. H. Davis of the Ohio Farm Bureau.

The afternoon program of Nov. 28 will feature two other panel discussions, with Dr. H. C. Young, Ohio Experiment Station, as moderator of the first. Participants in this symposium will include Mr. Neiswander, Joe Polifka, U.S.D.A., and Paul E. Tilford, American Arborist Association.

The second panel of the afternoon will discuss the question of "How Safe is Safe Regarding Pesticides"? Moderator for this session will be Mason Kirkland, Russell-Farley Co.; with the following appearing on the Round Table Panel: J. D. Wilson and T. H. Parks, Ohio Experiment Station; Calvin Robertson, Dow Chemical Co., Gordan A. Brandes, Rohm & Haas Co. and Bruce Gleisner, American Cyanamid Co.

Wednesday's program will see a continuation of panel discussions, with V. H. Davis chairman of the section. H. F. Winter is the moderator on the first panel, "Up-To-Date on Fungicide Usage," with the participants including Drs. J. D. Wilson and H. C. Young.

Bulletin

At press time it was announced by Gen. Douglas MacArthur that of an anticipated $360 million for Korean relief up to 1952, fifty million dollars would be needed for fertilizer exports to increase the yield of rice in that country. It is expected that the U. S. will bear the major portion of the supply.

Advertisers' Index

NOVEMBER, 1950

(The Advertisers' Index has been checked carefully but no responsibility can be assumed for any omission)

TALE ENDS

SO rapid has been the march of science in insect control of late, that we begin to fear, come 1951, that insecticides will just about fade out of the picture. Rather startling word comes from Arizona that electronics have entered the agricultural insect control picture through the unique application of amplified sound waves. A special secret device, these waves convert cotton plants, for example, into eucalyptus trees, leaving Mr. B. Weevil stranded without food. He starves to death. A study is now being conducted on what to do with the eucalyptus trees.

In Southern California, down San Joaquin Valley way, "guaranteed insect control is reported to come from another secret electronic device housed in a small box which emits a buzzing sound and a ray of light. Set up in the middle of a field prior to any signs of insect infestation, the crop is "treated" for ten minutes. This definitely puts the hex on any bugs which may invade the field at any time thereafter for six months, thus making them stay away.

A novel feature of this latter electronic system of control is that the farmer pays a monthy fee only as long as no insects show up on his crop. If bugs arrive, payments cease. All of which goes to illustrate the eminent fairness with which these newer scientists are willing to deal with the farmer.

That these newer marvels of science have not as yet been accepted or recommended by the experiment stations or USDA is explained simply. The experiment stations are in the grip of the entomologists who in addition to being backward, fear that the new science will wipe out all insect life and their jobs along with it. Furthermore, they are subsidized by the makers of DDT, toxaphene, BHC, et al, to keep these new scientific discoveries off the market. But, the electronic boys, confident that the path of modern science cannot be blocked forever, vow that eventually they will emerge victorious. After all, science is science, ain't it?

Increased yields prove it!

CAL-NITRO
TRADE MARK REG. U.S.PAT. OFF.

is the perfect topdresser

NITROGEN AT LOW COST

Cal-Nitro* is high in nitrogen—with a guaranteed nitrogen content of 20.5%. It supplies crops the nitrogen they need—at *low cost*.

QUICK ACTING—LONG LASTING

Cal-Nitro has half nitrate nitrogen and half ammonia nitrogen. Both forms are quick-acting. The ammonia form is long-lasting, since it resists leaching.

ESSENTIAL PLANT FOODS

Cal-Nitro also contains Calcium and Magnesium—plant foods which are essential for vigorous growth.

EXACTLY NEUTRAL

The soil reaction of Cal-Nitro is neutral. When applied to the soil, it does not increase or decrease soil acidity or measurably change pH values.

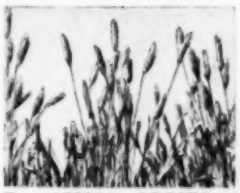
EASY TO APPLY

Cal-Nitro is in free-flowing pellet form. It doesn't blow away—and rattles off the leaves, reducing foliage burn to a minimum. It is easy to apply by hand or machine.

SYNTHETIC NITROGEN PRODUCTS CORP.
285 Madison Ave., New York 17, N. Y.

For CORN

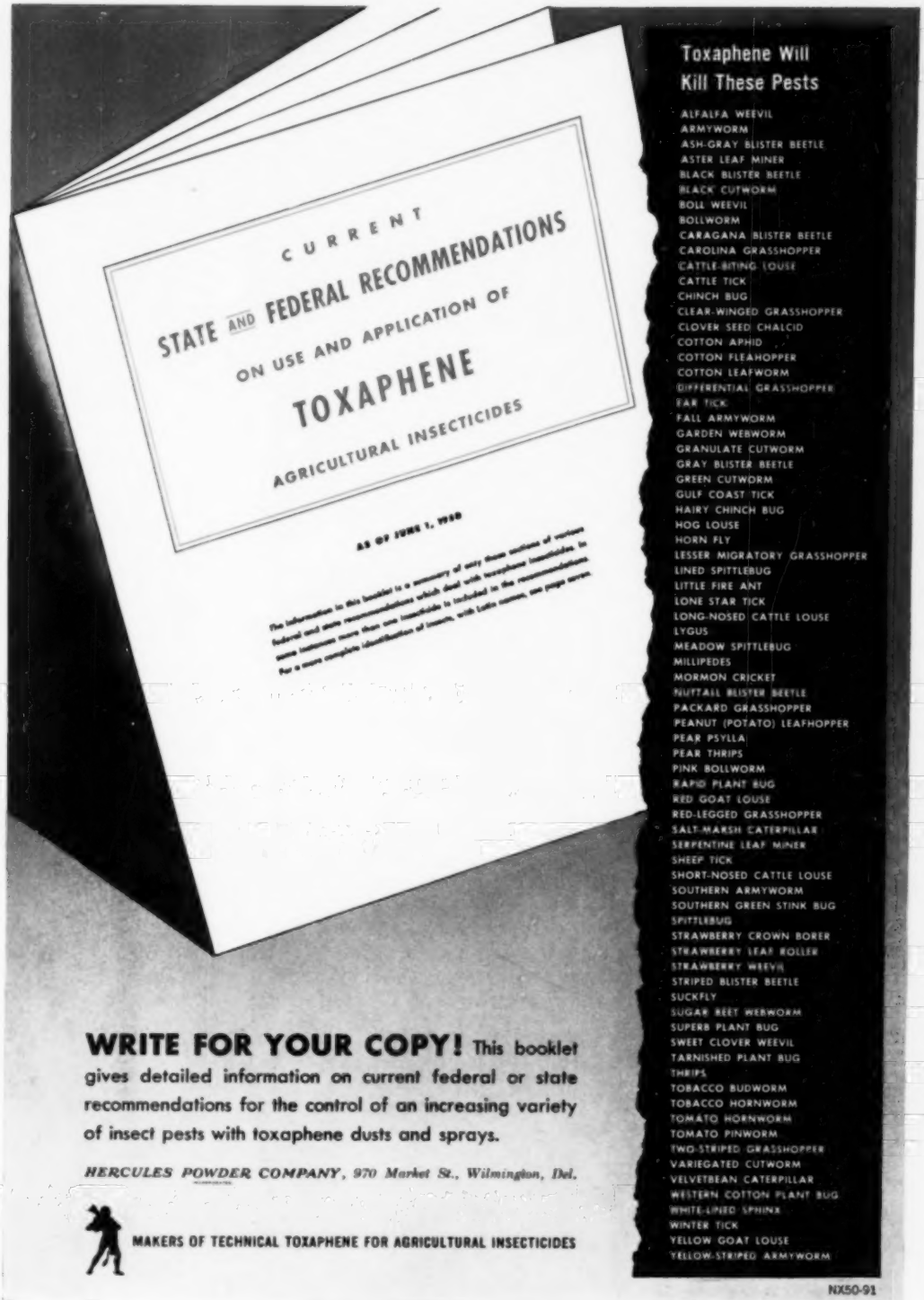
For COTTON



For SMALL GRAINS

For PASTURES

* The Synthetic Nitrogen Products Corporation owns the trademark "Cal-Nitro," which is used to designate a nitrogen fertilizer compound.



WRITE FOR YOUR COPY! This booklet gives detailed information on current federal or state recommendations for the control of an increasing variety of insect pests with toxaphene dusts and sprays.

HERCULES POWDER COMPANY, 970 Market St., Wilmington, Del.

MAKERS OF TECHNICAL TOXAPHENE FOR AGRICULTURAL INSECTICIDES

NX50-91